

# MAINTENANCE AND CHEMICAL REQUIREMENTS

FOR

U.S. PETROLEUM REFINERIES

AND

NATURAL GASOLINE PLANTS

A REPORT OF

THE NATIONAL PETROLEUM COUNCIL

1961

NATIONAL PETROLEUM COUNCIL

REPORT OF

THE COMMITTEE ON PETROLEUM REFINERY MAINTENANCE  
AND CHEMICAL REQUIREMENTS

FEBRUARY 7, 1961

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TECHNICAL SUBCOMMITTEE

VINCENT M. BROWN, SECRETARY

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Committee Membership

Technical Subcommittee Membership

February 7, 1961

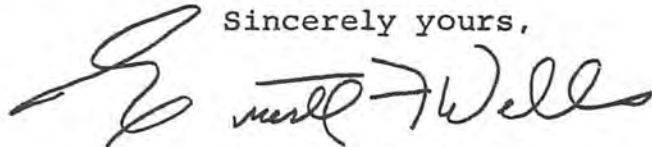
Mr. Walter S. Hallanan, Chairman  
National Petroleum Council  
1625 K Street, N. W.  
Washington 6, D. C.

Dear Mr. Hallanan:

On December 16, 1959, you appointed the National Petroleum Council's Committee on Petroleum Refinery Maintenance and Chemical Requirements pursuant to the Council's action taken at its meeting on October 20, 1959.

The following report has been prepared on the basis of, and in response to the Council's request. Included are tabulations showing the extent to which refineries and natural gasoline plants, in an emergency situation, may be limited in the production of specific finished and unfinished petroleum products due to normal inventories of, and inability to improvise for, critical maintenance supplies, and due to normal inventories of process chemicals. Also included are tabulations of the principal maintenance supplies carried in less than three months supply, with the location of the usual sources of supply; and the normal requirements, inventories and sources of supply for the most essential process chemicals. Data has been compiled by OCDM Regions and selected size groups for both refineries and natural gasoline plants.

Our Committee wishes to acknowledge the fine cooperation received from the petroleum and natural gas industries, and to thank the Technical Subcommittee for conducting the survey and preparing the summary report. We particularly wish to express our appreciation to Mr. James V. Brown, and his staff of the National Petroleum Council, for the guidance given this Committee and for securing and compiling the basic information in this report.

 Sincerely yours,

Everett F. Wells,  
Chairman



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
OFFICE OF THE SECRETARY  
Washington 25, D. C.

C  
O  
P  
Y

September 30, 1959

Dear Mr. Hallanan:

In view of the importance of the oil and gas industries to the national security, the joint efforts of the Government and the petroleum industry are necessary to assure that we will have adequate information and be properly prepared to meet any emergency. Under some possible emergency conditions, refineries may have to operate on an almost self-sufficient basis for a limited period of time. In order to locate the problems which might arise under such conditions, I would like the National Petroleum Council to appoint a committee to make a thorough study of the maintenance supplies and process chemicals needed to keep a refinery operating.

The National Petroleum Council prepared a very excellent report in 1951 on the Materials and Chemicals Requirements of the Oil and Gas Industries. This report listed the critical materials that were in short-supply. It has been very useful in long-range planning of petroleum industry requirements. The new study which I am proposing is of slightly different nature in that it concerns itself with the continuing operation of the petroleum industry under short-range emergency conditions which might exist before a national organization could become effective.

With reference to maintenance materials, it is suggested that each refinery be asked to review its maintenance requirements, identify those items which are kept in less than 3 months supply at the refinery, and note the location of the normal sources of supply of these materials.

With reference to process chemicals, it is suggested that each refinery be asked to indicate its normal requirements, its normal inventories and the location of its normal sources of supply.

As a result of this study the petroleum industry would be able to spot weaknesses that should be corrected, and the Federal government would be able to spot problems that might be critical to national defense.

Sincerely yours,

/S/ Elmer F. Bennett  
Acting Secretary of the Interior

Mr. Walter S. Hallanan  
Chairman, National Petroleum Council  
1625 K Street, N. W.  
Washington 6, D. C.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
OFFICE OF OIL AND GAS  
WASHINGTON 25, D.C.

April 4, 1960

Mr. Everett Wells  
President  
Ashland Oil & Refining Company  
1409 Winchester Avenue  
Ashland, Kentucky

Dear Mr. Wells:

In his letter of September 30, 1959, to Mr. Walter S. Hallanan, Chairman of the National Petroleum Council, Mr. Elmer Bennett, Acting Secretary of the Interior, requested that the National Petroleum Council undertake a survey of refinery maintenance and chemical requirements. Although natural gasoline plants are not refineries in the normal usage of that term, it is in accord with the intent of the request, mentioned above, that natural gasoline plants be included in the survey, as was the case on the materials and chemicals requirements survey made by the Council in 1951.

We appreciate the interest with which you and your committee have approached this project.

Sincerely yours,

/S/ M. V. Carson, Jr.

Director



REPORT  
OF  
THE TECHNICAL SUBCOMMITTEE  
TO THE  
NATIONAL PETROLEUM COUNCIL'S COMMITTEE  
ON  
PETROLEUM REFINERY MAINTENANCE AND CHEMICAL REQUIREMENTS

I SUMMARY

The comprehensive study conducted by the Technical Subcommittee, covering 284 refineries and 492 natural gasoline plants,\* provides detailed data on the ability of these plants to produce petroleum products at normal quality and quantity levels, assuming that either essential maintenance materials or chemicals needed for processing are unavailable outside the plants. The information was gathered at the request of the Department of the Interior to provide the Government with a reliable indication of the capabilities of refineries and NGL plants to make products during an immediate post-attack or disaster period.

Included in this report are numerous statistical tables based on the information submitted in the completed questionnaires, and compiled by size categories of plants and/or geographical Regions established by the Office of Civil and Defense Mobilization.

\* All references in this report to "natural gasoline" or "NGL" plants include both natural gasoline and natural gas liquids plants.

The results of the survey show that a very substantial portion of U. S. refinery capacity would be limited to less than ninety days (13 weeks) operation if restricted to in-plant inventories of process chemicals during the emergency. The operations of natural gasoline plants, under the same conditions, would be somewhat less limited by process chemicals.

Only a small percentage of total refinery capacity would be limited to less than thirteen weeks production if restricted to in-plant inventories of maintenance supplies. However, a substantial percentage of the total natural gasoline plant production capacity, under the same conditions, would be limited to something less than thirteen weeks operation.

The summary of these findings is shown in the table on the following page.

# SUMMARY TABLE

PRODUCTION LIMITATIONS OF U. S. REFINERIES AND NATURAL GASOLINE PLANTS  
ASSUMING NO MAINTENANCE SUPPLIES OR PROCESS CHEMICALS ARE AVAILABLE  
DURING AN EMERGENCY EXCEPT THOSE AT PLANT LOCATIONS

| REFINERIES            |  |   |  | NATURAL GASOLINE PLANTS            |  |   |   |
|-----------------------|--|---|--|------------------------------------|--|---|---|
| REFINERY PRODUCTS     | AS LIMITED BY<br>MAINTENANCE SUPPLIES                | AS LIMITED BY PROCESS CHEMICALS                     |  | NATURAL GASOLINE<br>PLANT PRODUCTS | AS LIMITED BY MAINTENANCE SUPPLIES                   | AS LIMITED BY PROCESS CHEMICALS             |   |
|                       | % TOTAL CAPACITY<br>LIMITED TO LESS<br>THAN 13 WEEKS | % TOTAL CAPACITY<br>LIMITED TO LESS<br>THAN 90 DAYS | DAYS PRODUCTION<br>FROM<br>LIMITED PLANTS* |                                    | % TOTAL CAPACITY<br>LIMITED TO LESS<br>THAN 13 WEEKS | WEEKS PRODUCTION<br>FROM<br>LIMITED PLANTS* | % TOTAL CAPACITY<br>LIMITED TO LESS<br>THAN 90 DAYS |
| LPG                   | 10.6   | 83.2  | 25   | PROPANE                            | 39.3   | 7   | 59.7  |
| AVIATION GASOLINE     | 12.3/10.3  | 87.9  | 17   | N- BUTANE                          | 39.0   | 7   | 64.5  |
| <u>MOTOR GASOLINE</u> |  |   |  | ISO-BUTANE                         | 39.4   | 9   | 60.0  |
| REGULAR               | 6.7  | 97.4  | 15   | MIXED BUTANES                      | 42.2   | 7   | 52.3  |
| PREMIUM               | 6.5  | 98.4  | 14   | ISO-PENTANE                        | 49.9   | 6   | 67.1  |
| OTHER                 | 1.5  | 92.4  | 12   | <u>STABILIZED NATURAL GASOLINE</u> |  |   |   |
| <u>JET FUEL</u>       |  |   |  | 12# and less RVP                   | 40.8   | 6   | 52.5  |
| JP-4                  | 3.6  | 67.6  | 29   | Over 12# including 14# RVP         | 47.4   | 7   | 64.1  |
| JP-5                  | 0.0  | 71.1  | 21   | Over 14# including 18# RVP         | 17.2   | 7   | 56.8  |
| OTHER                 | 4.0  | 81.1  | 27   | Over 18# including 26# RVP         | 32.2   | 7   | 60.0  |
| NAPHTHA               | 3.1  | 66.7  | 33   | Over 26# RVP                       | 30.5   | 6   | 32.2  |
| KEROSINE              | 4.2  | 69.7  | 28   | <u>MOTOR GASOLINE</u>              |  |   |   |
| DIESEL FUEL           | 5.7  | 64.3  | 30   | REGULAR                            | 13.6   | 7   | 81.3  |
| DISTILLATE FUEL OIL   | 6.3  | 73.3  | 31   | OTHER                              | 0.8  | 4   | 61.7  |
| RESIDUAL FUEL OIL     | 5.7  | 47.4  | 31   | CONDENSATE                         | 26.1   | 7   | 65.1  |
| ASPHALT               | 5.6  | 44.1  | 33   | KEROSINE & HEAVIER                 | 65.2   | 9   | 35.0  |
| LUBRICATING OILS      | 4.7  | 93.2  | 26   | SULFUR                             | 35.9   | 5   | 52.9  |
| WAXES                 | 1.6  | 78.7  | 29   | MIXED LPG                          | 38.1   | 8   | 76.2  |
| GREASES               | 4.5  | 79.6  | 27   | OTHERS                             | 50.5   | 8   | 48.4  |
| PETROLEUM COKE        | 5.2  | 52.3  | 22   |                                    |  |   |   |
| OTHERS                | 11.1   | 76.5  | 28   |                                    |  |   |   |

\* Equivalent days (or weeks) of full production during a 90 - day period for limited plants.  
Weighted by plant size.



## II ORIGIN AND PURPOSE OF MAINTENANCE SUPPLIES AND PROCESS CHEMICALS STUDY

On September 30, 1959, the Honorable Elmer F. Bennett, Acting Secretary of the U.S. Department of the Interior, requested that Mr. Walter S. Hallanan, Chairman of the National Petroleum Council, appoint a committee to make a thorough study of the maintenance supplies and process chemicals needed for continuance of petroleum refinery operations on a self-sufficient basis, under short-range emergency conditions. On April 4, 1960, Captain M. V. Carson, Jr., Director of the Office of Oil and Gas, Department of the Interior, requested that the original study be expanded to include natural gasoline plants.

The Agenda Committee of the Council, in its report of October 19, 1959, which was unanimously adopted by the National Petroleum Council at its meeting on October 20, 1959, recommended that a committee be appointed to undertake the study as requested by the Department of the Interior. Pursuant to this action, Mr. Hallanan, on December 16, 1959, appointed the Committee on Petroleum Refinery Maintenance and Chemical Requirements, under the Chairmanship of Mr. Everett F. Wells, President of Ashland Oil and Refining Company. Mr. Harry E. Jacobs, Office of Oil and Gas, U.S. Department of the Interior, was designated Government Co-Chairman of this Committee by Captain Carson. Subsequently on August 16, 1960, Mr. Thomas A. Peake was appointed Government Co-Chairman replacing Mr. Jacobs.

At the request of Chairman Wells, Mr. Hallanan appointed the Technical Subcommittee to determine the best method of obtaining the data asked for by the Government, to gather and compile such data, and to report back to the Main Committee.

### III METHOD USED IN OBTAINING DATA

The Technical Subcommittee met on March 10, 1960, and drafted a questionnaire and sheet of instructions designed to collect the desired information. The appropriate forms were then mailed to all known companies in the United States owning or operating refineries and/or natural gasoline plants. The mailing list was based on information from previous Council surveys; the Office of Oil and Gas and the Bureau of Mines in the Department of the Interior; the Natural Gasoline Association of America, and applicable trade directories.

The questionnaires were mailed from the Council office to 450 companies on June 20, 1960, with a request that completed forms be returned to the Council by July 25, 1960. Follow-up letters to non-reporting companies were mailed on August 5 and August 30, 1960.

Returns were received from 392 companies supplying information on 284 refineries and 492 natural gasoline plants. A review of the reports received shows that the capacity reported represents over 98% of total U. S. capacity for both refineries and natural gasoline plants.

The staff of the National Petroleum Council compiled the data from the completed returns and prepared the tables for this report. The Technical Subcommittee met in Washington, D.C. on December 13, 1960, and again on January 9, 1961, to analyze the compiled data and prepare this report.



An analysis of the returns received follows:

TOTAL NUMBER OF COMPANIES

MAILED QUESTIONNAIRES:

TOTALS

|                                      |            |     |
|--------------------------------------|------------|-----|
| (1) Refining Companies               | 201        |     |
| (2) Natural Gasoline Plant Operators | <u>249</u> | 450 |

TOTAL RETURNS RECEIVED:

(1) Returns with Applicable Data:

|                                      |            |  |
|--------------------------------------|------------|--|
| (a) Refining Companies               | 149        |  |
| (b) Natural Gasoline Plant Operators | <u>151</u> |  |
| Total                                | 300        |  |

(2) Returns not Applicable:\*

|                                      |           |            |
|--------------------------------------|-----------|------------|
| (a) Refining Companies               | 27        |            |
| (b) Natural Gasoline Plant Operators | <u>65</u> |            |
| Total                                | 92        | <u>392</u> |

TOTAL COMPANIES NOT REPLYING:

|                                      |           |    |
|--------------------------------------|-----------|----|
| (1) Refining Companies               | 25        |    |
| (2) Natural Gasoline Plant Operators | <u>33</u> | 58 |

Returns were analyzed both by OCDM Regions and plant size groups. Table 1 presents a breakdown by OCDM Regions and size groups for the refineries and natural gasoline plants reported in the survey. A map of the OCDM Regions appears in Appendix Table A.

\*Companies sold facilities; merged operations with a reporting company; out of business, etc.

#### IV DISCUSSION OF RESULTS

##### 1. INTRODUCTION

The questionnaires sent out by the Subcommittee were designed to obtain information with respect to the following:

- (a) The extent to which refineries and natural gasoline plants may be limited in the production of finished and unfinished petroleum products in an immediate post-attack or disaster period by plant inventories of maintenance materials or process chemicals.
- (b) With reference to maintenance materials, identification of those items kept in less than three months supply at plant locations, and location of normal sources of supply of these materials.
- (c) With reference to process chemicals, the normal requirements, inventories, and location of supply sources.

Reporting companies were asked not to list materials and chemicals not vitally essential to plant processes and quality of product, i.e., having no appreciable effect upon the capability of the plant to produce finished products at normal quantity levels.

##### 2. ASSUMPTIONS

In connection with the data contained in this report, the Subcommittee wishes to emphasize the following assumptions:

- (a) All companies contacted were requested, for the purpose of this survey, to assume that their plants would have continued access to normal supplies of crude oil and natural gas in an emergency situation. In addition, companies were asked to assume that the continued operations of their plants would not be limited by any inability to dispose of either finished or intermediate products.
- (b) With reference to maintenance materials requirements, reporting companies were to assume that no abnormal periodic facility turn-around would be undertaken in any post-attack period of short duration.
- (c) The Subcommittee wishes to point out that many plants are dependent on outside sources of electric power, water, etc. Data obtained through this survey assumes sustained adequate operations by the utilities.

### 3. MAINTENANCE MATERIALS

Tables 2 and 3 of this report show the estimates made by refinery and natural gasoline plant operators of the number of weeks it would be possible to produce specified petroleum or natural gas liquids products at substantial normal quantity levels, assuming no maintenance supplies were available other than those in the plant at the time of



the emergency. For the purpose of these estimates, it was assumed that the plant operation would not be limited by lack of process chemicals supplies. Where a plant could operate for more than thirteen weeks, companies were asked to indicate this by showing "13 plus" rather than a specific number of weeks.

The majority of U. S. petroleum refineries, unlike natural gasoline plants, would be able to operate and produce their normal products for a period of at least thirteen weeks without having access to maintenance supplies located outside the plant itself. Those refineries reporting that they would be limited to something less than thirteen weeks production of any product, because of a maintenance supply problem, represent a capacity ranging only from 1.5% to 11.1% of the total production capacity of all refineries for any given product, as shown in Table 2. About 10% of total productive capacity for Liquefied Petroleum Gas and Aviation Gasoline would be limited to less than thirteen weeks. Only 6% of total motor gasoline production capacity, and about 4% of jet fuel capacity would be limited to less than thirteen weeks production.

The survey revealed that a different situation exists in the case of natural gasoline plant operations, as detailed on Table 3 of the report. 30% to 50% of the total capacity of natural gasoline plants was reported to be limited to less than thirteen weeks produc-

tion of major product if unable to obtain outside maintenance supplies. About 40% of total propane and butanes capacity would be limited to an equivalent of seven to nine weeks of full production; while 20% to 40% of stabilized natural gasoline capacity (of all types) would be limited to the equivalent of six or seven weeks of full production. Only 26% of condensate capacity would be limited to the equivalent of seven weeks of full production.

Table 4 of the report sets forth, by categories, specific maintenance supplies kept in less than three months supply at plant locations and reported by 5% or more of the refineries or NGL plants listing such items. These items represent essential specific maintenance supplies for which no substitutes are available at a plant location. The items are shown in Table 4, within each category, by order of the frequency with which they were reported. In addition, estimated delivery times and normal supply regions are shown.

It will be noted that bearings are the maintenance supply items most frequently reported as being kept in less than three months inventory. However, these items are generally obtainable by plants in less than five days delivery time and within the same OCDM Region where the plant is located.

No attempt should be made to correlate Tables 2 or 3 with Table 4. Table 4 represents a summary of plant inventory situations,



viz. those essential maintenance items not kept in three months normal supply at plant location. Tables 2 and 3 show production limitations that might result during an emergency period due to inability of plants to obtain those outside supplies of maintenance materials for which no substitute or improvisation can be made at the plant. World War II experience has proved that the ingenuity of maintenance and operating staffs can contribute quite measurably to the keeping of a plant operating at or near full production for long periods of time. Table 4, while providing a comprehensive list of key maintenance items, does not accurately reflect the number of plants using each particular item. Maintenance supply inventory practices vary widely within the industry, so that many plants have on hand more than a three months supply of a given item, and would, therefore, not be reported in Table 4.

A supplemental list of all key maintenance materials reported as kept in less than three months supply at plants and not shown in Table 4, is set forth in the Appendix Table B.

#### 4. PROCESS CHEMICALS

The companies participating in the survey were requested to estimate the number of days it would be possible for their refineries or natural gasoline plants to produce products, assuming no process chemicals were available other than those existent in the plant at the time of the emergency. For the purpose of these estimates, it was



assumed that the plant operation would not be limited by any lack of maintenance supplies. Those reporting companies who could continue production of a product for more than ninety days, were asked to so indicate by showing "90 plus" rather than a specific number of days.

Table 5 shows the number of refineries reporting that would be limited to something less than ninety days production, if unable to obtain outside process chemicals supplies. It appears that under these conditions we could expect as much as 98.4% of the estimated U. S. capacity of those refineries producing motor gasoline might be limited, while only 44.1% of the estimated capacity of those producing asphalt might be limited, with the limitations relative to other products ranging somewhere in between.

The following table shows the percentage of the U. S. total capacity of those refineries producing the principal products that would be limited to a less than 90-day operation period, for lack of process chemicals, and the equivalent number of days of full production for such limited plants in the same period.

| <u>Product</u>      | <u>% of Total Capacity<br/>Limited</u> | <u>Equivalent Days of Full<br/>Production for<br/>Limited Plants</u> |
|---------------------|--|--|
| Premium Gasoline    | 98.4                                   | 14   |
| Reg. Motor Gasoline | 97.4                                   | 15   |
| Aviation Gasoline   | 93.2                                   | 17   |
| Kerosine            | 87.9                                   | 28   |
| Jet Fuel (JP-4)     | 73.3                                   | 29   |
| Distillate Fuel Oil | 69.7                                   | 31   |
| Residual Fuel Oil   | 67.6                                   | 31   |
| Lubricating Oils    | 47.4                                   | 26   |

Table 6 indicates that, with respect to natural gasoline plant products, the inability to obtain outside supplies of process chemicals does not restrict production as severely as in the case of refinery products. A range of from 32% to 65% of capacity of those plants producing the principal NGL products would be limited to a less than 90-day production period. But these plants could continue production of these products for a period equivalent to 33 to 52 days of full production. About 60% of the capacity of those plants producing propane and butanes would be limited to 40-46 equivalent days of full production; while 32% to 65% of those plants producing stabilized natural gasoline (all types) and condensate would be limited to the equivalent of 33 to 52 full days of production.

Reporting companies were asked to list the specific process chemicals which are required to maintain production of the products manufactured by their refineries or natural gasoline plants. They were also requested to indicate the normal requirements per stream day of operation; the average normal inventory; the estimated days for delivery of additional supply under normal conditions, and the location of the sources of supply of such process chemicals.

Set forth below, as reported, are the daily consumption, calculated average day's supply, and estimated normal delivery time data for certain highly essential chemicals needed for continuance of

normal refinery operations:

|     | <u>Chemicals</u>                        | <u>Normal Use<br/>Per/SD<br/>(Pounds)</u> | <u>Average<br/>Days'<br/>Supply<br/>(Days)</u> | <u>Estimated<br/>Normal<br/>Delivery<br/>Time<br/>(Days)</u> |
|-----|---|---|--|--|
| (a) | Sulphuric Acid<br>(Lube Oil Processing) | 404,537                                   | 7  | 2  |
| (b) | Tetraethyl Lead<br>(Motor Mix)          | 1,657,099                                 | 11   | 7  |
| (c) | Sulphuric Acid<br>(Catalyst)            | 5,708,000                                 | 12   | 2  |
| (d) | Tetraethyl Lead<br>(Aviation Mix)       | 240,023                                   | 18   | 7  |
| (e) | Cracking Catalysts                      | 1,806,277                                 | 23   | 11   |
| (f) | Sodium Hydroxide<br>(Treating)          | 1,223,056                                 | 27   | 6  |

Tables 7 thru 19 show the data as reported for the principal, essential chemicals, by OCDM Regions and/or plant size groups, for both refineries and natural gasoline plants. All other essential process chemicals reported, but not shown in Tables 7-19, are listed in Appendix Tables C and D.



ESTIMATED WEEKS U.S. REFINERIES REPORTED COULD MANUFACTURE PRODUCTS  
ASSUMING MAINTENANCE SUPPLIES LIMITED TO THOSE AT REFINERY LOCATION

|   | LPG  | MOTOR GASOLINE |      | JET FUEL |      | NAPHTHA | KEROSENE | DIESEL | FUEL OIL |      | ASPHALT | LUBE OIL | WAXES | GREASES | PET. COKE | OTHER PET. PRODUCTS |
|---|------|----------------|------|----------|------|---------|----------|--------|----------|------|---------|----------|-------|---------|-----------|---------------------|
|   |      | AV-GAL         | REG. | JP-4     | JP-5 |         |          |        | OTHER    | JP-4 |         |          |       |         |           |                     |
| TOTAL UNITED STATES   |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 136  | 57             | 227  | 204      | 50   | 118     | 26       | 44     | 128      | 191  | 238     | 220      | 223   | 130     | 43        | 90                  |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.  | 17   | 6              | 31   | 27       | 4    | 11      | 0        | 3      | 15       | 22   | 32      | 29       | 26    | 21      | 3         | 11                  |
| % OF TOTAL CAPACITY REPRESENTED BY REFS. LIMITED TO LESS THAN 13 WEEKS PRODUCTION | 10.6 | 10.3           | 6.7  | 6.5      | 1.5  | 3.6     | 0        | 4.0    | 3.1      | 4.2  | 5.7     | 6.3      | 5.7   | 5.6     | 1.6       | 11.1                |
| TOTAL UNITED STATES BY SIZE GROUPS  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT (Bbls/CD Crude Charge Capacity)                            |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| Less than 9,900   | 15   | 2              | 74   | 59       | 19   | 33      | 4        | 6      | 60       | 59   | 96      | 77       | 82    | 45      | 14        | 26                  |
| 10 - 49,900   | 78   | 16             | 101  | 93       | 17   | 51      | 7        | 12     | 44       | 85   | 93      | 92       | 90    | 58      | 12        | 29                  |
| 50 - 99,900   | 21   | 17             | 26   | 26       | 4    | 14      | 4        | 13     | 9        | 24   | 23      | 25       | 25    | 13      | 4         | 7                   |
| 100 - 199,900   | 18   | 16             | 20   | 20       | 8    | 15      | 8        | 10     | 11       | 17   | 20      | 20       | 20    | 11      | 7         | 16                  |
| 200,000 plus  | 4    | 6              | 6    | 6        | 2    | 5       | 3        | 3      | 4        | 6    | 6       | 6        | 6     | 3       | 6         | 1                   |
| TOTAL UNITED STATES   | 136  | 57             | 227  | 204      | 50   | 118     | 26       | 44     | 128      | 191  | 238     | 220      | 223   | 130     | 43        | 90                  |
| NO. REFS. LIMITED TO LESS THAN 13 WKS. PRODUCTION (Bbls/CD Crude Charge Capacity) |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| Less than 9,900   | 2    | 0              | 16   | 13       | 3    | 5       | 0        | 1      | 11       | 12   | 20      | 16       | 13    | 14      | 1         | 5                   |
| 10 - 49,900   | 11   | 1              | 11   | 10       | 1    | 5       | 0        | 0      | 4        | 9    | 9       | 9        | 10    | 6       | 2         | 3                   |
| 50 - 99,900   | 3    | 4              | 4    | 4        | 0    | 1       | 0        | 2      | 0        | 1    | 3       | 4        | 3     | 1       | 0         | 1                   |
| 100 - 199,900   | 0    | 0              | 0    | 0        | 0    | 0       | 0        | 0      | 0        | 0    | 0       | 0        | 0     | 0       | 0         | 1                   |
| 200,000 plus  | 1    | 1              | 0    | 0        | 0    | 0       | 0        | 0      | 0        | 0    | 0       | 0        | 0     | 0       | 0         | 1                   |
| TOTAL UNITED STATES   | 17   | 6              | 31   | 27       | 4    | 11      | 0        | 3      | 15       | 22   | 32      | 29       | 26    | 31      | 3         | 11                  |
| OCDM REGIONS  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| REGION NO. 1  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 7    | 4              | 9    | 7        | 2    | 2       | 1        | 2      | 5        | 7    | 6       | 12       | 9     | 8       | 3         | 5                   |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 1    | 1              | 1    | 1        | 0    | 0       | 0        | 0      | 0        | 0    | 1       | 2        | 1     | 1       | 0         | 0                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 12   | 12             | 12   | 12       | -    | -       | -        | -      | -        | -    | 12      | 8-12     | 12    | 8       | -         | -                   |
| REGION NO. 2  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 18   | 5              | 27   | 24       | 3    | 13      | 9        | 5      | 20       | 29   | 28      | 34       | 24    | 15      | 15        | 16                  |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 1    | 0              | 1    | 1        | 0    | 0       | 0        | 0      | 3        | 3    | 2       | 3        | 0     | 3       | 0         | 0                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 1    | -              | 4    | 4        | -    | -       | -        | -      | 4-9      | 4-8  | 4       | 4-8      | -     | 4-8     | -         | -                   |
| REGION NO. 3  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 2    | 0              | 3    | 1        | 0    | 3       | 0        | 1      | 4        | 3    | 7       | 8        | 5     | 8       | 2         | 3                   |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 1    | -              | 2    | 1        | -    | 1       | -        | 0      | 2        | 1    | 3       | 3        | 1     | 3       | -         | 1                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 4    | -              | 6-8  | 4        | -    | 8       | -        | -      | 6-8      | 8    | 3-8     | 3-8      | 8     | 3-8     | -         | 6                   |
| REGION NO. 4  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 15   | 6              | 36   | 32       | 3    | 13      | 0        | 4      | 14       | 33   | 36      | 39       | 39    | 18      | 4         | 12                  |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 2    | 1              | 7    | 5        | 0    | 4       | -        | 1      | 2        | 6    | 7       | 7        | 7     | 4       | 1         | 3                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 8-12 | 4              | 2-12 | 2-12     | -    | 4-12    | -        | 4      | 8        | 4-12 | 4-12    | 4-12     | 4-12  | 4-12    | 8         | 4                   |
| REGION NO. 5  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 48   | 27             | 79   | 75       | 20   | 45      | 11       | 20     | 45       | 70   | 78      | 52       | 68    | 29      | 15        | 31                  |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 7    | 2              | 10   | 11       | 2    | 3       | 0        | 1      | 3        | 6    | 9       | 5        | 7     | 5       | 2         | 4                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 4-8  | 7-8            | 4-10 | 4-10     | 4-5  | 8-10    | -        | 1      | 5-10     | 4-10 | 4-10    | 4-10     | 4-10  | 2-10    | 2-6       | 2-8                 |
| REGION NO. 6  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 21   | 4              | 33   | 30       | 12   | 17      | 0        | 2      | 18       | 30   | 35      | 32       | 32    | 22      | 3         | 3                   |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 1    | 0              | 3    | 2        | 1    | 0       | -        | 0      | 1        | 2    | 4       | 2        | 4     | 1       | 0         | 1                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 2    | -              | 2-10 | 2-10     | 6    | -       | -        | -      | 6        | 2-6  | 2-12    | 2-6      | 2-12  | 12      | -         | 8                   |
| REGION NO. 7  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 19   | 10             | 28   | 25       | 7    | 18      | 4        | 8      | 21       | 15   | 34      | 30       | 34    | 21      | 3         | 16                  |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 2    | 1              | 6    | 5        | 1    | 3       | 0        | 0      | 4        | 4    | 5       | 6        | 5     | 4       | 0         | 2                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 4    | 4              | 2-6  | 2-6      | 2    | 4-8     | -        | -      | 2-8      | 4-8  | 2-8     | 2-8      | 2-8   | 2-8     | -         | 4-8                 |
| REGION NO. 8  |      |                |      |          |      |         |          |        |          |      |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT  | 6    | 1              | 12   | 10       | 3    | 7       | 1        | 2      | 1        | 4    | 14      | 13       | 12    | 9       | 0         | 4                   |
| NO. LIMITED TO LESS 13 WKS. PROD.   | 2    | 1              | 1    | 1        | 0    | 0       | 0        | 1      | 0        | 0    | 1       | 1        | 1     | 0       | -         | 0                   |
| RANGE OF WEEKS FOR LIMITED REFS.  | 5-8  | 5              | 5    | 5        | -    | -       | -        | 5      | -        | -    | 5       | 5        | 5     | -       | -         | -                   |



ESTIMATED WEEKS U.S. NATURAL GASOLINE PLANTS REPORTED COULD MANUFACTURE PRODUCTS  
ASSUMING MAINTENANCE SUPPLIES LIMITED TO THOSE AT PLANT LOCATION

|  | STABILIZED NATURAL GASOLINE |          |            |               |                |                        |                        |                        |                        |              | NATURAL GASOLINE |       |            |                  | OTHER PRODUCTS |
|--|-----------------------------|----------|------------|---------------|----------------|------------------------|------------------------|------------------------|------------------------|--------------|------------------|-------|------------|------------------|----------------|
|  | PROPANE                     | N-BUTANE | ISO-BUTANE | MIXED BUTANES | 12% & LESS RVP | OVER 12% INCL. 14% RVP | OVER 14% INCL. 16% RVP | OVER 16% INCL. 18% RVP | OVER 18% INCL. 20% RVP | OVER 20% RVP | GASOLINE         |       | CONDENSATE | KEROSENE "HEAVY" | SULFUR DMS.    |
|  |                             |          |            |               |                |                        |                        |                        |                        |              | REGULATED        | OTHER |            |                  |                |
| <b>TOTAL UNITED STATES</b>   |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 317                         | 131      | 100        | 219           | 100            | 100                    | 79                     | 90                     |                        | 87           | 16               | 7     | 124        | 40               | 11             |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 129                         | 50       | 42         | 97            | 44             | 47                     | 26                     | 31                     |                        | 34           | 8                | 1     | 40         | 22               | 4              |
| % OF TOTAL CAPACITY REPRESENTED BY PLANTS LIMITED TO LESS THAN 13 WEEKS PRODUCTION | 39.3%                       | 39.0%    | 39.4%      | 42.2%         | 40.5%          | 47.4%                  | 17.2%                  | 32.2%                  |                        | 10.5%        | 13.6%            | 0.8%  | 26.1%      | 65.2%            | 30.1%          |
| AVG. WKS. PROD. OF LIMITED PLANTS*   | 7                           | 7        | 9          | 7             | 6              | 7                      | 7                      | 7                      |                        | 6            | 7                | 4     | 7          | 9                | 8              |
| <b>TOTAL UNITED STATES BY SIZE GROUPS</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT (Bbls/D of Liquid Recovery)                                |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| Less than 499  | 53                          | 14       | 5          | 55            | 1              | 18                     | 25                     | 30                     |                        | 25           | 3                | 1     | 22         | 5                | 4              |
| 500 - 999  | 55                          | 15       | 9          | 46            | 4              | 15                     | 17                     | 18                     |                        | 15           | 1                | 0     | 17         | 4                | 1              |
| 1,000 - 1,999  | 89                          | 28       | 21         | 52            | 10             | 18                     | 17                     | 24                     |                        | 26           | 3                | 0     | 24         | 10               | 3              |
| 2,000 - 2,999  | 41                          | 17       | 18         | 27            | 4              | 16                     | 8                      | 5                      |                        | 9            | 2                | 1     | 23         | 5                | 0              |
| 3,000 - 4,999  | 36                          | 20       | 21         | 20            | 6              | 15                     | 10                     | 5                      |                        | 7            | 5                | 4     | 20         | 6                | 1              |
| 5,000 & OVER   | 43                          | 27       | 26         | 19            | 4              | 10                     | 8                      | 8                      |                        | 5            | 2                | 1     | 10         | 8                | 2              |
| <b>TOTAL UNITED STATES</b>   | 317                         | 131      | 100        | 219           | 29             | 100                    | 79                     | 90                     |                        | 87           | 16               | 7     | 124        | 40               | 11             |
| NO. PLANTS LIMITED TO LESS THAN 13 WEEKS PRODUCTION (Bbls/D of Liquid Recovery)    |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| Less than 499  | 23                          | 4        | 1          | 27            | 1              | 12                     | 12                     | 10                     |                        | 11           | 3                | 1     | 8          | 6                | 2              |
| 500 - 999  | 21                          | 7        | 5          | 21            | 3              | 6                      | 3                      | 5                      |                        | 5            | 0                | 0     | 4          | 2                | 0              |
| 1,000 - 1,999  | 36                          | 15       | 12         | 17            | 6              | 5                      | 9                      | 9                      |                        | 12           | 0                | 0     | 9          | 3                | 1              |
| 2,000 - 2,999  | 18                          | 6        | 6          | 14            | 1              | 6                      | 3                      | 3                      |                        | 4            | 1                | 0     | 9          | 0                | 1              |
| 3,000 - 4,999  | 15                          | 8        | 8          | 11            | 3              | 8                      | 5                      | 2                      |                        | 1            | 1                | 0     | 7          | 1                | 1              |
| 5,000 & OVER   | 16                          | 10       | 10         | 7             | 2              | 7                      | 0                      | 8                      |                        | 1            | 0                | 0     | 3          | 7                | 4              |
| <b>TOTAL UNITED STATES</b>   | 129                         | 50       | 42         | 97            | 16             | 44                     | 26                     | 31                     |                        | 34           | 8                | 1     | 40         | 22               | 4              |
| <b>AVERAGE NO. WEEKS PRODUCTION FOR LIMITED PLANTS</b>                             |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| (Bbls/D of Liquid Recovery)  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| Less than 499  | 7                           | 10       | 4          | 7             | 4              | 7                      | 7                      | 7                      |                        | 6            | 9                | 4     | 8          | 11               | 8              |
| 500 - 999  | 7                           | 6        | 6          | 8             | 5              | 9                      | 8                      | 7                      |                        | 6            | 0                | 0     | 8          | 0                | 4              |
| 1,000 - 1,999  | 7                           | 7        | 7          | 7             | 8              | 6                      | 6                      | 5                      |                        | 5            | 0                | 0     | 8          | 4                | 2              |
| 2,000 - 2,999  | 8                           | 9        | 9          | 8             | 12             | 9                      | 10                     | 9                      |                        | 4            | 6                | 0     | 8          | 7                | 10             |
| 3,000 - 4,999  | 7                           | 8        | 8          | 7             | 9              | 7                      | 5                      | 7                      |                        | 2            | 2                | 0     | 7          | 12               | 8              |
| 5,000 & OVER   | 7                           | 7        | 9          | 6             | 4              | 7                      | 7                      | 7                      |                        | 12           | 9                | 0     | 6          | 9                | 8              |
| <b>TOTAL UNITED STATES</b>   | 7                           | 7        | 9          | 7             | 6              | 7                      | 7                      | 7                      |                        | 6            | 7                | 4     | 7          | 9                | 8              |
| <b>OCIM REGION</b>   |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| <b>REGION NO. 1**</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| <b>REGION NO. 2</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 5                           | 4        | 1          | 4             | 1              | 4                      | 4                      | 10                     |                        | 2            | 0                | 0     | 2          | 0                | 1              |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 0                           | 1        | 0          | 1             | 0              | 0                      | 0                      | 0                      |                        | 0            | 0                | 0     | 0          | 0                | 1              |
| RANGE OF WKS. FOR LIMITED PLANTS   | -                           | 12       | -          | 12            | -              | -                      | -                      | -                      |                        | -            | -                | -     | -          | -                | 7              |
| <b>REGION NO. 3</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 3                           | 0        | 0          | 1             | 0              | 0                      | 1                      | 1                      |                        | 1            | 0                | 0     | 1          | 0                | 0              |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 0                           | -        | -          | 0             | -              | -                      | 0                      | 0                      |                        | 0            | 0                | 0     | 0          | -                | -              |
| RANGE OF WKS. FOR LIMITED PLANTS   | -                           | -        | -          | -             | -              | -                      | -                      | -                      |                        | -            | -                | -     | -          | -                | -              |
| <b>REGION NO. 4</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 4                           | 3        | 4          | 0             | 2              | 2                      | 1                      | 0                      |                        | 1            | 0                | 0     | 0          | 0                | 0              |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 0                           | 0        | 0          | 0             | 0              | 0                      | 0                      | -                      |                        | 0            | 0                | 0     | 0          | -                | -              |
| RANGE OF WKS. FOR LIMITED PLANTS   | -                           | -        | -          | -             | -              | -                      | -                      | -                      |                        | -            | -                | -     | -          | -                | -              |
| <b>REGION NO. 5</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 238                         | 96       | 80         | 179           | 94             | 80                     | 51                     | 47                     |                        | 47           | 15               | 7     | 111        | 38               | 7              |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 104                         | 44       | 38         | 82            | 44             | 39                     | 20                     | 18                     |                        | 19           | 4                | 1     | 37         | 21               | 3              |
| RANGE OF WKS. FOR LIMITED PLANTS   | 1-12                        | 2-12     | 2-12       | 1-12          | 1-12           | 1-12                   | 1-12                   | 2-12                   |                        | 1-12         | 4-12             | 4     | 4-12       | 2-12             | 4-12           |
| <b>REGION NO. 6</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 27                          | 7        | 3          | 16            | 1              | 11                     | 10                     | 12                     |                        | 7            | 1                | 0     | 5          | 2                | 0              |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 8                           | 1        | 0          | 7             | 0              | 5                      | 2                      | 4                      |                        | 0            | 1                | 0     | 1          | 1                | 1              |
| RANGE OF WKS. FOR LIMITED PLANTS   | 1-12                        | 4        | -          | 1-12          | -              | 4-12                   | 1-6                    | 6-12                   |                        | -            | 9                | -     | 4          | 6                | 8              |
| <b>REGION NO. 7</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 38                          | 11       | 12         | 17            | 1              | 4                      | 11                     | 19                     |                        | 19           | 0                | 0     | 5          | 0                | 3              |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 15                          | 4        | 4          | 5             | 0              | 1                      | 3                      | 8                      |                        | 15           | -                | -     | 2          | 1                | 0              |
| RANGE OF WKS. FOR LIMITED PLANTS   | 4-8                         | 5-8      | 5-8        | 4-8           | -              | 8                      | 5-6                    | 4-8                    |                        | 2-8          | -                | -     | 5-8        | -                | 6              |
| <b>REGION NO. 8</b>  |                             |          |            |               |                |                        |                        |                        |                        |              |                  |       |            |                  |                |
| NO. PLANTS MFG. PRODUCT  | 2                           | 0        | 0          | 2             | 0              | 1                      | 1                      | 1                      |                        | 0            | 0                | 0     | 0          | 0                | 0              |
| NO. LIMITED TO LESS THAN 13 WKS. PROD.   | 2                           | -        | -          | 2             | -              | 1                      | 1                      | 1                      |                        | -            | -                | -     | -          | -                | -              |
| RANGE OF WKS. FOR LIMITED PLANTS   | 4-8                         | -        | -          | 4-8           | -              | 8                      | 4-6                    | 4-6                    |                        | -            | -                | -     | -          | -                | -              |

\* Weighted average for U.S. based on average capacity of plants within each size classification.

\*\*No RGL Plants are located in OCIM Region 1.

Report of National Petroleum Council's Committee on Petroleum Refinery Maintenance and Chemical Requirements  
(1960) dated February 7, 1961.



ESSENTIAL MAINTENANCE SUPPLIES KEPT IN LESS THAN 1 MONTH INVENTORY  
BY U. S. PETROLEUM AND NATURAL GASLINE PLANT LOCATIONS  
(For Additional Maintenance Supply Items Reported, See Appendix Table B)

| REPORTING ITEM - BY RANGE OF DAYS ESTIMATED NORMAL DELIVERY TIME |      |      |      |      |      |      |      |      |       | RANGE SOURCES OF SUPPLY FOR ESTIMATED LOCATED IN OCM REGION NO. |      |      |      |      |      |      |      |      |       | REPORTING ITEM - BY RANGE OF DAYS ESTIMATED NORMAL DELIVERY TIME |      |      |      |      |      |      |      |       |      | RANGE SOURCES OF SUPPLY FOR PLANTS LOCATED IN OCM REGION |      |      |      |       |  |  |  |  |  |
|--|------|------|------|------|------|------|------|------|-------|---|------|------|------|------|------|------|------|------|-------|--|------|------|------|------|------|------|------|-------|------|--|------|------|------|-------|--|--|--|--|--|
| UNDER 1  |      |      |      |      |      |      |      |      |       | 1   |      |      |      |      |      |      |      |      |       | FROM 5   |      |      |      |      |      |      |      |       |      | 5  |      |      |      |       |  |  |  |  |  |
| 1 - 14   |      |      |      |      |      |      |      |      |       | 2   |      |      |      |      |      |      |      |      |       | 15 - 29  |      |      |      |      |      |      |      |       |      | 6  |      |      |      |       |  |  |  |  |  |
| Days   | Days | Days | Days | Days | Days | Days | Days | Days | Total | Days  | Days | Days | Days | Days | Days | Days | Days | Days | Total | Days   | Days | Days | Days | Days | Days | Days | Days | Total | Days | Days   | Days | Days | Days | Total |  |  |  |  |  |
| AIR & GAS COMPRESSORS (EXCLUDING AIR)                            |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| BEARINGS   | 10   | 11   | 2    | 7    | 2    | 5    | 10   |      |       |   |      |      |      |      |      |      |      |      | 19    | 11   | 3    | 13   | 12   | 2    | 107* |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| RINGS  | 15   | 11   | 7    | 14   | 2    | 3    | 50   |      |       |   |      |      |      |      |      |      |      |      | 16    | 11   | 7    | 14   | 8    | 2    | 66   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PISTONS  | 8    | 5    | 1    | 11   | 2    | 7    | 44   |      |       |   |      |      |      |      |      |      |      |      | 14    | 10   | 6    | 13   | 14   | 5    | 54   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| CONNECTING RODS  | 9    | 5    | 1    | 9    | 1    | 5    | 40   |      |       |   |      |      |      |      |      |      |      |      | 12    | 10   | 4    | 12   | 14   | 2    | 57   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| VALVES   | 13   | 10   | 1    | 8    | 1    | 8    | 39   |      |       |   |      |      |      |      |      |      |      |      | 6     | 18   | 7    | 21   | 13   | 8    | 73   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PACKING  | 6    | 8    | 4    | 3    | 1    | 8    | 30   |      |       |   |      |      |      |      |      |      |      |      | 19    | 12   | 8    | 12   | 8    | 8    | 55   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| LINERS   | 3    | 4    | 6    | 2    | 1    | 1    | 24   |      |       |   |      |      |      |      |      |      |      |      | 10    | 15   | 2    | 10   | 18   | 8    | 54   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| VALVES & PARTS   | 3    | 4    | 6    | 2    | 1    | 1    | 24   |      |       |   |      |      |      |      |      |      |      |      | 11    | 17   | 1    | 8    | 8    | 2    | 45   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| COMPRESSORS (EXCLUDING AIR)                                      |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| BEARINGS   | 11   | 3    | 4    | 4    | 1    | 1    | 24   |      |       |   |      |      |      |      |      |      |      |      | 8     | 3  | 7    | 2    | 1    | 0    | 20*  |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| IMPELLER AND/OR SHAFT  | 1    | 2    | 2    | 2    | 1    | 8    | 16   |      |       |   |      |      |      |      |      |      |      |      | 1     | 0  | 0    | 0    | 0    | 0    | 1    | 1    | 0    |       |      |  |      |      |      |       |  |  |  |  |  |
| BOILER EQUIPMENT   |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PIPES  | 88   | 11   | 1    | 0    | 0    | 0    | 100* |      |       |   |      |      |      |      |      |      |      |      | 71    | 14   | 0    | 1    | 0    | 0    | 86*  |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| MISCELLANEOUS MOTOR PARTS  | 62   | 8    | 1    | 1    | 0    | 0    | 72   |      |       |   |      |      |      |      |      |      |      |      | 45    | 11   | 0    | 0    | 0    | 0    | 56   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PIPEWORK   | 15   | 6    | 1    | 1    | 0    | 0    | 23   |      |       |   |      |      |      |      |      |      |      |      | 40    | 11   | 1    | 1    | 0    | 0    | 53   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| VALVES, TUBES, AND/OR PARTS                                      | 15   | 2    | 2    | 1    | 0    | 0    | 21   |      |       |   |      |      |      |      |      |      |      |      | 14    | 2  | 1    | 0    | 0    | 0    | 17   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| WATERGATES   | 20   | 2    | 0    | 0    | 0    | 0    | 22   |      |       |   |      |      |      |      |      |      |      |      | 14    | 2  | 0    | 0    | 0    | 0    | 16   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| MOTORS, PUMPS, ETC.  |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PUMP BLADES  | 0    | 0    | 1    | 16   | 0    | 0    | 17   |      |       |   |      |      |      |      |      |      |      |      | 3     | 0  | 0    | 7    | 2    | 0    | 10*  |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| BEARINGS   | 10   | 2    | 2    | 2    | 0    | 0    | 14   |      |       |   |      |      |      |      |      |      |      |      | 17    | 7  | 1    | 1    | 1    | 1    | 28   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PISTONS  | 2    | 0    | 0    | 0    | 0    | 0    | 2    |      |       |   |      |      |      |      |      |      |      |      | 6     | 0  | 7    | 11   | 4    | 1    | 28   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| VALVES & SEALS   | 1    | 1    | 2    | 2    | 1    | 0    | 7    |      |       |   |      |      |      |      |      |      |      |      | 3     | 4  | 1    | 1    | 1    | 1    | 11   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| MISC. REPLACEMENT PARTS  | 0    | 0    | 2    | 5    | 1    | 1    | 9    |      |       |   |      |      |      |      |      |      |      |      | 3     | 1  | 1    | 1    | 1    | 1    | 7    |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| DOORS, MOTOR, PUMP CASE  | 2    | 0    | 2    | 3    | 1    | 4    | 12   |      |       |   |      |      |      |      |      |      |      |      | 7     | 3  | 2    | 2    | 0    | 0    | 12   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| ELECTRICAL SYSTEM  |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| CIRCUIT BREAKERS   | 8    | 10   | 0    | 10   | 2    | 8    | 38   |      |       |   |      |      |      |      |      |      |      |      | 10    | 10   | 10   | 4    | 4    | 4    | 40   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| SWITCHES   | 15   | 13   | 8    | 8    | 2    | 8    | 52   |      |       |   |      |      |      |      |      |      |      |      | 15    | 14   | 10   | 5    | 4    | 4    | 48   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| WIRING   | 15   | 13   | 7    | 8    | 1    | 1    | 45   |      |       |   |      |      |      |      |      |      |      |      | 17    | 14   | 10   | 1    | 1    | 1    | 44   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| CABLE  | 14   | 8    | 8    | 8    | 2    | 1    | 41   |      |       |   |      |      |      |      |      |      |      |      | 17    | 14   | 10   | 1    | 1    | 1    | 44   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| TRANSFORMERS   | 11   | 8    | 8    | 8    | 2    | 1    | 38   |      |       |   |      |      |      |      |      |      |      |      | 7     | 11   | 4    | 2    | 1    | 1    | 25   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| WIND   | 21   | 11   | 2    | 4    | 1    | 0    | 42   |      |       |   |      |      |      |      |      |      |      |      | 10    | 10   | 4    | 1    | 0    | 0    | 33   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| UNIDUALT   | 15   | 8    | 2    | 2    | 0    | 0    | 27   |      |       |   |      |      |      |      |      |      |      |      | 13    | 7  | 4    | 0    | 0    | 0    | 24   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| RELAYS   | 10   | 2    | 1    | 7    | 1    | 0    | 21   |      |       |   |      |      |      |      |      |      |      |      | 15    | 5  | 2    | 2    | 0    | 0    | 24   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| INSULATORS   | 11   | 2    | 1    | 1    | 0    | 0    | 15   |      |       |   |      |      |      |      |      |      |      |      | 9     | 4  | 5    | 2    | 0    | 0    | 16   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| ENGINE - GAS, DIESEL, STEAM                                      |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| BEARINGS   | 16   | 4    | 2    | 4    | 1    | 0    | 27   |      |       |   |      |      |      |      |      |      |      |      | 10    | 10   | 1    | 9    | 10   | 2    | 32   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| RINGS  | 12   | 7    | 2    | 6    | 1    | 1    | 23   |      |       |   |      |      |      |      |      |      |      |      | 18    | 19   | 2    | 10   | 14   | 3    | 54   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PISTONS  | 5    | 2    | 4    | 10   | 2    | 0    | 19   |      |       |   |      |      |      |      |      |      |      |      | 15    | 14   | 3    | 9    | 11   | 4    | 52   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| VALVES   | 6    | 4    | 1    | 7    | 0    | 1    | 19   |      |       |   |      |      |      |      |      |      |      |      | 18    | 15   | 8    | 10   | 11   | 2    | 64   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PACKING  | 8    | 4    | 3    | 4    | 1    | 2    | 22   |      |       |   |      |      |      |      |      |      |      |      | 25    | 22   | 6    | 10   | 5    | 1    | 69   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| CYLINDERS  | 1    | 2    | 3    | 4    | 2    | 4    | 16   |      |       |   |      |      |      |      |      |      |      |      | 10    | 16   | 8    | 12   | 13   | 1    | 50   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| MISC. ENGINE PARTS   | 7    | 5    | 2    | 7    | 1    | 1    | 19   |      |       |   |      |      |      |      |      |      |      |      | 7     | 3  | 2    | 2    | 0    | 0    | 12   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| GENERATORS   |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| BEARINGS   | 14   | 4    | 1    | 4    | 1    | 1    | 21   |      |       |   |      |      |      |      |      |      |      |      | 16    | 8  | 1    | 1    | 5    | 1    | 26   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PUMPS - RECIPROCATING  |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| BEARINGS   | 8    | 10   | 2    | 4    | 1    | 1    | 27   |      |       |   |      |      |      |      |      |      |      |      | 18    | 20   | 8    | 14   | 8    | 0    | 60   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PISTONS  | 11   | 14   | 5    | 1    | 1    | 0    | 32   |      |       |   |      |      |      |      |      |      |      |      | 17    | 23   | 8    | 8    | 1    | 1    | 57   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| VALVES   | 14   | 3    | 4    | 14   | 1    | 2    | 42   |      |       |   |      |      |      |      |      |      |      |      | 14    | 15   | 6    | 10   | 5    | 2    | 52   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PACKING  | 2    | 0    | 0    | 7    | 5    | 4    | 18   |      |       |   |      |      |      |      |      |      |      |      | 13    | 10   | 0    | 12   | 2    | 1    | 26   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PISTONS  | 4    | 0    | 7    | 11   | 8    | 0    | 30   |      |       |   |      |      |      |      |      |      |      |      | 13    | 13   | 9    | 12   | 2    | 4    | 50   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| CYLINDERS  | 2    | 0    | 0    | 4    | 4    | 0    | 10   |      |       |   |      |      |      |      |      |      |      |      | 6     | 10   | 4    | 11   | 0    | 1    | 31   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| RINGS  | 1    | 0    | 0    | 4    | 3    | 1    | 9    |      |       |   |      |      |      |      |      |      |      |      | 16    | 22   | 1    | 10   | 1    | 1    | 31   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PACKING  | 4    | 7    | 2    | 1    | 2    | 0    | 16   |      |       |   |      |      |      |      |      |      |      |      | 8     | 12   | 1    | 9    | 0    | 0    | 20   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| VALVES   | 1    | 0    | 1    | 2    | 2    | 0    | 6    |      |       |   |      |      |      |      |      |      |      |      | 9     | 6  | 1    | 10   | 2    | 0    | 28   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PUMPS - CENTRIFUGAL  |      |      |      |      |      |      |      |      |       |   |      |      |      |      |      |      |      |      |       |  |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| BEARINGS   | 61   | 16   | 0    | 2    | 0    | 0    | 79   |      |       |   |      |      |      |      |      |      |      |      | 56    | 20   | 7    | 5    | 12   | 0    | 95   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| IMPELLERS  | 4    | 9    | 7    | 12   | 15   | 0    | 47   |      |       |   |      |      |      |      |      |      |      |      | 18    | 19   | 1    | 17   | 14   | 0    | 69   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| SEALS  | 10   | 17   | 10   | 13   | 4    | 1    | 55   |      |       |   |      |      |      |      |      |      |      |      | 20    | 21   | 15   | 12   | 12   | 1    | 76   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| SHAFTS   | 5    | 17   | 5    | 20   | 7    | 1    | 55   |      |       |   |      |      |      |      |      |      |      |      | 12    | 13   | 5    | 14   | 14   | 2    | 58   |      |      |       |      |  |      |      |      |       |  |  |  |  |  |
| PACKING  | 11   | 17   | 5    | 20   | 7    | 1    | 55   |      |       |   |      |      |      |      |      |      |      |      | 10    | 24   |      |      |      |      |      |      |      |       |      |  |      |      |      |       |  |  |  |  |  |



ESTIMATED DAYS U.S. REFINERIES REPORTED COULD MANUFACTURE PRODUCTS  
ASSUMING SUPPLIES OF PROCESS CHEMICALS LIMITED TO THOSE IN PLANT INVENTORY

TABLE 5

|  | LPG   | AV-GAS | MOTOR GASOLINE |       |       | JET FUEL |       |       | NAPHTHA | KEROSENE | DIESEL | FUEL OIL   |          | ASPHALT | LUBE OIL | WAXES | GREASES | PET. COKE | OTHER PET. PRODUCTS |
|--|-------|--------|----------------|-------|-------|----------|-------|-------|---------|----------|--------|------------|----------|---------|----------|-------|---------|-----------|---------------------|
|  |       |        | REG.           | PREM. | OTHER | JP-4     | JP-5  | OTHER |         |          |        | DISTILLATE | RESIDUAL |         |          |       |         |           |                     |
| <b>TOTAL UNITED STATES</b>   |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFINERIES MFG. PRODUCT<br>NO. LIMITED TO LESS THAN<br>90 DAYS PRODUCTION                                | 136   | 57     | 227            | 204   | 50    | 118      | 26    | 44    | 128     | 191      | 238    | 220        | 223      | 110     | 71       | 43    | 31      | 40        | 90                  |
| % OF TOTAL CAPACITY REPRESENTED<br>BY REFS. LIMITED TO LESS THAN<br>90 DAYS PRODUCTION OF<br>LIMITED PLANTS* | 83.2  | 87.9   | 97.4           | 98.4  | 92.4  | 67.6     | 71.1  | 81.1  | 66.7    | 69.7     | 64.3   | 73.3       | 47.4     | 44.1    | 93.2     | 78.7  | 79.6    | 52.3      | 76.5                |
| AVG. DAYS PRODUCTION OF<br>LIMITED PLANTS*   | 25    | 17     | 15             | 14    | 12    | 29       | 21    | 27    | 33      | 28       | 30     | 31         | 31       | 33      | 26       | 29    | 27      | 22        | 28                  |
| <b>TOTAL UNITED STATES BY SIZE GROUP</b>   |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFINERIES MFG. PRODUCT<br>(Bbls/CD Crude Charge Capacity)   |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| Less than 9,900  | 15    | 2      | 74             | 59    | 19    | 33       | 4     | 6     | 60      | 59       | 96     | 77         | 82       | 45      | 29       | 14    | 7       | 2         | 26                  |
| 10 - 49,900  | 78    | 16     | 101            | 93    | 17    | 51       | 7     | 12    | 44      | 85       | 93     | 92         | 90       | 58      | 16       | 12    | 6       | 24        | 29                  |
| 50 - 99,900  | 21    | 17     | 26             | 26    | 4     | 14       | 4     | 13    | 9       | 24       | 23     | 25         | 25       | 13      | 8        | 4     | 4       | 7         | 15                  |
| 100 - 199,900  | 18    | 16     | 20             | 20    | 8     | 15       | 8     | 10    | 11      | 17       | 20     | 20         | 20       | 11      | 12       | 7     | 8       | 5         | 16                  |
| 200,000 plus   | 4     | 6      | 6              | 6     | 2     | 5        | 3     | 3     | 4       | 6        | 6      | 6          | 6        | 3       | 6        | 6     | 6       | 2         | 4                   |
| <b>TOTAL UNITED STATES</b>   | 136   | 57     | 227            | 204   | 50    | 118      | 26    | 44    | 128     | 191      | 238    | 220        | 223      | 110     | 71       | 43    | 31      | 40        | 90                  |
| NO. REFINERIES LIMITED TO LESS THAN<br>90 DAYS PRODUCTION<br>(Bbls/CD Crude Charge Capacity)                 |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| Less than 9,900  | 6     | 2      | 59             | 48    | 10    | 19       | 1     | 3     | 29      | 20       | 42     | 33         | 32       | 23      | 23       | 4     | 6       | 1         | 20                  |
| 10 - 49,900  | 57    | 16     | 94             | 89    | 11    | 30       | 4     | 9     | 21      | 49       | 51     | 58         | 44       | 29      | 13       | 8     | 5       | 10        | 23                  |
| 50 - 99,900  | 18    | 16     | 26             | 26    | 4     | 11       | 3     | 11    | 7       | 20       | 14     | 20         | 14       | 12      | 7        | 4     | 3       | 4         | 12                  |
| 100 - 199,900  | 15    | 16     | 20             | 20    | 8     | 11       | 8     | 7     | 8       | 13       | 15     | 15         | 10       | 4       | 11       | 5     | 6       | 3         | 12                  |
| 200,000 plus   | 4     | 6      | 6              | 6     | 2     | 5        | 3     | 3     | 4       | 6        | 6      | 6          | 6        | 3       | 6        | 6     | 6       | 2         | 4                   |
| <b>TOTAL UNITED STATES*</b>  | 100   | 56     | 202            | 189   | 35    | 74       | 17    | 33    | 68      | 106      | 126    | 131        | 102      | 68      | 60       | 26    | 25      | 19        | 70                  |
| <b>AVERAGE NO. DAYS PRODUCTION<br/>FOR LIMITED PLANTS</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| (Bbls/CD Crude Charge Capacity)  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| Less than 9,900  | 49    | 17     | 31             | 30    | 32    | 42       | 45    | 20    | 41      | 40       | 38     | 39         | 37       | 32      | 30       | 37    | 43      | 30        | 37                  |
| 10 - 49,900  | 28    | 22     | 20             | 19    | 19    | 33       | 41    | 37    | 34      | 32       | 34     | 33         | 30       | 31      | 30       | 15    | 24      | 28        | 24                  |
| 50 - 99,900  | 25    | 14     | 15             | 14    | 14    | 25       | 16    | 25    | 40      | 32       | 33     | 30         | 29       | 34      | 39       | 40    | 41      | 37        | 22                  |
| 100 - 199,900  | 25    | 14     | 13             | 12    | 12    | 24       | 23    | 23    | 23      | 24       | 26     | 29         | 30       | 30      | 28       | 31    | 25      | 18        | 31                  |
| 200,000 plus   | 21    | 23     | 9              | 9     | 6     | 31       | 9     | 33    | 40      | 26       | 32     | 31         | 40       | 27      | 27       | 27    | 26      | 9         | 32                  |
| <b>TOTAL UNITED STATES*</b>  | 25    | 17     | 15             | 14    | 12    | 29       | 21    | 27    | 33      | 28       | 30     | 31         | 31       | 33      | 26       | 29    | 27      | 22        | 28                  |
| <b>OCUM REGIONS</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| <b>REGION NO. 1</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 7     | 4      | 9              | 7     | 2     | 2        | 1     | 2     | 5       | 7        | 6      | 12         | 9        | 8       | 5        | 3     | 2       | 1         | 5                   |
|  | 8-45  | 10-35  | 4-45           | 4-45  | 10    | 10       | -     | 60    | 19-45   | 8-60     | 8-60   | 8-60       | 8-30     | 8-60    | 30-50    | 2-32  | 30-32   | 45        | 30-45               |
| <b>REGION NO. 2</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 18    | 5      | 27             | 24    | 3     | 13       | 9     | 5     | 20      | 29       | 28     | 34         | 24       | 15      | 19       | 15    | 10      | 6         | 16                  |
|  | 8-55  | 3-30   | 2-75           | 1-75  | 28-30 | 11-45    | 13-30 | 11-52 | 11-60   | 11-60    | 11-60  | 11-60      | 11-60    | 13-52   | 2-45     | 25-45 | 10-67   | 11-60     | 15-50               |
| <b>REGION NO. 3</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 2     | 0      | 3              | 1     | 0     | 3        | 0     | 1     | 4       | 3        | 7      | 8          | 5        | 8       | 2        | 0     | 0       | 0         | 3                   |
|  | 30-60 | -      | 30-60          | 30    | -     | 60       | -     | -     | 60      | -        | 21-60  | 21-60      | 30-60    | 21-60   | 21-30    | -     | -       | -         | 30-60               |
| <b>REGION NO. 4</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 15    | 6      | 36             | 32    | 3     | 13       | 0     | 4     | 14      | 33       | 36     | 39         | 39       | 18      | 7        | 4     | 3       | 9         | 12                  |
|  | 6-30  | 7-50   | 2-50           | 2-45  | -     | 25-45    | -     | 25-47 | 20-60   | 14-60    | 14-60  | 14-60      | 14-60    | 14-47   | 14-56    | 30-60 | 30      | 25-33     | 23-30               |
| <b>REGION NO. 5</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 48    | 27     | 79             | 75    | 20    | 45       | 11    | 20    | 45      | 70       | 78     | 52         | 68       | 29      | 20       | 15    | 8       | 10        | 31                  |
|  | 2-60  | 2-60   | 5-65           | 5-60  | 5-30  | 7-77     | 9-60  | 1-70  | 7-70    | 6-70     | 8-70   | 37         | 36       | 16      | 20       | 11    | 7       | 7         | 23                  |
| <b>REGION NO. 6</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 21    | 4      | 33             | 30    | 12    | 17       | 0     | 2     | 18      | 30       | 35     | 32         | 32       | 22      | 7        | 3     | 2       | 8         | 3                   |
|  | 7-60  | 7-40   | 4-60           | 5-38  | 15-60 | 20-60    | -     | 20-49 | 25-60   | 20-60    | 5-60   | 10-75      | 20-60    | 20-70   | 4-60     | 45    | 4       | 30-45     | 20-30               |
| <b>REGION NO. 7</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 19    | 10     | 28             | 25    | 7     | 18       | 4     | 8     | 21      | 15       | 34     | 30         | 34       | 21      | 11       | 3     | 6       | 5         | 16                  |
|  | 7-80  | 5-35   | 5-60           | 5-60  | 7-20  | 6-60     | 6-45  | 6-20  | 15-60   | 6-60     | 7-70   | 7-60       | 6-60     | 9-60    | 7-45     | 9-60  | 7-30    | 7-14      | 3-60                |
| <b>REGION NO. 8</b>  |       |        |                |       |       |          |       |       |         |          |        |            |          |         |          |       |         |           |                     |
| NO. REFS. MFG. PRODUCT<br>NO. LIMITED TO LESS THAN 90 DAYS PROD.<br>RANGE OF DAYS FOR LIMITED REFINERIES     | 6     | 1      | 12             | 10    | 3     | 7        | 1     | 2     | 1       | 4        | 14     | 13         | 12       | 9       | 0        | 0     | 0       | 1         | 4                   |
|  | 7-84  | 10     | 7-30           | 7-30  | 15-30 | 20-60    | 3     | -     | 60      | 20-30    | 15-60  | 14-60      | 20-60    | 20-60   | -        | -     | -       | -         | 20-30               |

\* Weighted average for U.S. based on average capacity of refineries within each size classification.



ESTIMATED DAYS U.S. NATURAL GASOLINE PLANTS REPORTED COULD MANUFACTURE PRODUCTS  
— ASSUMING SUPPLIES OF PROCESS CHEMICALS LIMITED TO THOSE IN PLANT INVENTORY

|   | PROPANE | N-BUTANE | ISO-BUTANE | MIXED<br>BUTANES | ISO-PENTANE | STABILIZED NATURAL GASOLINE |                           |                           |                           | MOTOR GASOLINE            |                 | KEROSENE &<br>HEAVIER | SULFUR<br>LPG | MIXED<br>LPG | OTHER<br>PRODUCTS |
|---|---------|----------|------------|------------------|-------------|-----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----------------|-----------------------|---------------|--------------|-------------------|
|   |         |          |            |                  |             | 12% & LESS<br>RVP           | OVER 12%<br>INCL. 14% RVP | OVER 14%<br>INCL. 16% RVP | OVER 16%<br>INCL. 18% RVP | OVER 18%<br>INCL. 20% RVP | OVER 20%<br>RVP |                       |               |              |                   |
| TOTAL UNITED STATES   |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| NO. PLANTS MFG. PRODUCT   | 317     | 121      | 100        | 219              | 28          | 100                         | 100                       | 79                        | 90                        | 97                        | 16              | 7                     | 124           | 40           | 11                |
| NO. LIMITED TO LESS THAN<br>90 DAYS PRODUCTION  | 150     | 69       | 56         | 95               | 17          | 54                          | 48                        | 28                        | 33                        | 34                        | 8               | 5                     | 60            | 12           | 6                 |
| % OF TOTAL CAPACITY REPRESENTED<br>BY PLANTS LIMITED TO LESS THAN<br>90 DAYS PRODUCTION | 59.7    | 64.5     | 60.0       | 52.3             | 67.1        | 52.5                        | 64.1                      | 56.8                      | 60.0                      | 32.7                      | 41.3            | 61.7                  | 45.1          | 52.9         | 76.2              |
| AVERAGE DAYS PRODUCTION OF<br>LIMITED PLANTS *  | 40      | 46       | 44         | 40               | 35          | 33                          | 52                        | 48                        | 38                        | 40                        | 32              | 16                    | 35            | 49           | 22                |
| TOTAL UNITED STATES BY SIZE GROUPS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| NO. PLANTS MFG. PRODUCT<br>(Bbls./D Liquid Recovery)                                    |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| Less than 500   | 53      | 14       | 5          | 55               | 1           | 18                          | 31                        | 25                        | 30                        | 25                        | 3               | 1                     | 22            | 5            | 4                 |
| 500 - 999   | 55      | 15       | 9          | 46               | 4           | 15                          | 21                        | 17                        | 18                        | 18                        | 1               | 0                     | 17            | 4            | 1                 |
| 1,000 - 1,999   | 89      | 20       | 21         | 52               | 10          | 18                          | 17                        | 16                        | 24                        | 26                        | 3               | 0                     | 24            | 10           | 3                 |
| 2,000 - 2,999   | 41      | 17       | 10         | 27               | 4           | 16                          | 6                         | 8                         | 9                         | 9                         | 2               | 1                     | 23            | 6            | 0                 |
| 3,000 - 4,999   | 36      | 20       | 21         | 20               | 6           | 15                          | 10                        | 5                         | 5                         | 7                         | 5               | 4                     | 20            | 1            | 2                 |
| 5,000 & over  | 43      | 22       | 26         | 32               | 4           | 18                          | 15                        | 8                         | 8                         | 5                         | 2               | 1                     | 10            | 1            | 0                 |
| TOTAL UNITED STATES   | 317     | 121      | 100        | 219              | 29          | 100                         | 100                       | 72                        | 90                        | 97                        | 16              | 7                     | 124           | 40           | 11                |
| NO. PLANTS LIMITED TO LESS<br>THAN 90 DAYS PRODUCTION<br>(Bbls./D Liquid Recovery)      |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| Less than 500   | 19      | 6        | 2          | 20               | 0           | 11                          | 10                        | 6                         | 7                         | 10                        | 0               | 0                     | 6             | 1            | 0                 |
| 500 - 999   | 16      | 7        | 5          | 17               | 2           | 7                           | 10                        | 3                         | 6                         | 6                         | 0               | 1                     | 5             | 1            | 0                 |
| 1,000 - 1,999   | 43      | 15       | 11         | 22               | 6           | 9                           | 9                         | 7                         | 11                        | 11                        | 0               | 0                     | 6             | 2            | 0                 |
| 2,000 - 2,999   | 21      | 8        | 6          | 13               | 2           | 9                           | 3                         | 5                         | 3                         | 7                         | 2               | 1                     | 16            | 0            | 0                 |
| 3,000 - 4,999   | 22      | 15       | 14         | 12               | 4           | 9                           | 5                         | 1                         | 4                         | 3                         | 4               | 1                     | 14            | 0            | 1                 |
| 5,000 & over  | 22      | 18       | 16         | 11               | 3           | 11                          | 11                        | 6                         | 6                         | 13                        | 2               | 0                     | 13            | 2            | 1                 |
| TOTAL UNITED STATES   | 150     | 69       | 56         | 95               | 17          | 54                          | 48                        | 28                        | 33                        | 34                        | 8               | 5                     | 60            | 12           | 6                 |
| AVERAGE NO. DAYS PRODUCTION<br>FOR LIMITED PLANTS<br>(Bbls./D Liquid Recovery)          |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| Less than 500   | 36      | 34       | 45         | 34               | —           | 38                          | 32                        | 30                        | 47                        | 48                        | —               | 50                    | 32            | —            | 60                |
| 500 - 999   | 43      | 34       | 39         | 42               | 38          | 29                          | 41                        | 45                        | 47                        | 45                        | —               | 40                    | 42            | 30           | —                 |
| 1,000 - 1,999   | 42      | 42       | 38         | 37               | 23          | 40                          | 50                        | 38                        | 38                        | 41                        | —               | 47                    | 40            | 53           | 25                |
| 2,000 - 2,999   | 39      | 34       | 36         | 33               | 45          | 32                          | 31                        | 38                        | 49                        | 52                        | 33              | 6                     | 37            | 60           | —                 |
| 3,000 - 4,999   | 33      | 31       | 31         | 36               | 26          | 30                          | 47                        | 60                        | 19                        | 30                        | 22              | 18                    | 34            | 30           | 13                |
| 5,000 & over  | 44      | 32       | 49         | 44               | 40          | 33                          | 52                        | 52                        | 44                        | 40                        | 40              | 35                    | 35            | 39           | 36                |
| TOTAL UNITED STATES   | 40      | 46       | 44         | 40               | 35          | 33                          | 52                        | 48                        | 38                        | 40                        | 32              | 16                    | 35            | 49           | 22                |
| OCDM REGIONS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 1 **   |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 2  | 5       | 4        | 1          | 4                | 0           | 1                           | 4                         | 4                         | 10                        | 2                         | 0               | 0                     | 2             | 0            | 1                 |
| NO. PLANTS MFG. PRODUCT   | 0       | 1        | 0          | 1                | —           | 1                           | 1                         | 0                         | 0                         | 0                         | —               | —                     | 1             | 0            | 1                 |
| NO. LIMITED TO LESS THAN 90 DAYS PROD.  | —       | 12       | —          | 12               | —           | 12                          | 12                        | —                         | —                         | —                         | —               | —                     | 10            | 90           | 30                |
| RANGE OF DAYS FOR LIMITED PLANTS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 3  | 3       | 0        | 0          | 1                | 0           | 0                           | 0                         | 1                         | 1                         | 1                         | 0               | 0                     | 1             | 0            | 0                 |
| NO. PLANTS MFG. PRODUCT   | 0       | —        | —          | 0                | —           | —                           | —                         | 0                         | 0                         | 0                         | —               | —                     | —             | —            | —                 |
| NO. LIMITED TO LESS THAN 90 DAYS PROD.  | —       | —        | —          | —                | —           | —                           | —                         | —                         | —                         | —                         | —               | —                     | —             | —            | —                 |
| RANGE OF DAYS FOR LIMITED PLANTS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 4  | 4       | 3        | 4          | 0                | 2           | 2                           | 0                         | 1                         | 0                         | 1                         | 0               | 0                     | 0             | 0            | 0                 |
| NO. PLANTS MFG. PRODUCT   | 0       | 0        | 0          | —                | 0           | 0                           | —                         | 0                         | —                         | —                         | —               | —                     | —             | —            | —                 |
| NO. LIMITED TO LESS THAN 90 DAYS PROD.  | —       | —        | —          | —                | —           | —                           | —                         | —                         | —                         | —                         | —               | —                     | —             | —            | —                 |
| RANGE OF DAYS FOR LIMITED PLANTS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 5  | 238     | 96       | 80         | 179              | 25          | 94                          | 80                        | 51                        | 47                        | 47                        | 15              | 7                     | 131           | 6            | 7                 |
| NO. PLANTS MFG. PRODUCT   | 117     | 57       | 48         | 75               | 16          | 51                          | 37                        | 19                        | 18                        | 16                        | 7               | 5                     | 55            | 2            | 21                |
| NO. LIMITED TO LESS THAN 90 DAYS PROD.  | 1-85    | 1-80     | 1-80       | 5-85             | 1-60        | 1-80                        | 4-85                      | 13-60                     | 17-60                     | 13-60                     | 6-60            | 6-30                  | 13-75         | 30           | 30-60             |
| RANGE OF DAYS FOR LIMITED PLANTS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 6  | 27      | 7        | 3          | 16               | 1           | 2                           | 11                        | 10                        | 12                        | 7                         | 1               | 0                     | 5             | 2            | 0                 |
| NO. PLANTS MFG. PRODUCT   | 12      | 3        | 0          | 9                | 0           | 1                           | 6                         | 5                         | 5                         | 2                         | 1               | 2                     | 2             | 0            | 1                 |
| NO. LIMITED TO LESS THAN 90 DAYS PROD.  | 10-60   | 13-50    | —          | 10-60            | —           | 60                          | 10-50                     | 13-50                     | 28-60                     | 43-60                     | 50              | —                     | 30-50         | 50-60        | 50                |
| RANGE OF DAYS FOR LIMITED PLANTS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 7  | 38      | 11       | 12         | 17               | 1           | 1                           | 4                         | 11                        | 19                        | 28                        | 0               | 0                     | 5             | 0            | 3                 |
| NO. PLANTS MFG. PRODUCT   | 20      | 8        | 6          | 9                | 1           | 1                           | 3                         | 4                         | 10                        | 14                        | —               | —                     | 2             | —            | 3                 |
| NO. LIMITED TO LESS THAN 90 DAYS PROD.  | 8-75    | 8-60     | 8-60       | 30-75            | 60          | 60                          | 30-60                     | 30-60                     | 8-60                      | 21-80                     | —               | —                     | 60            | —            | 8-75              |
| RANGE OF DAYS FOR LIMITED PLANTS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |
| REGION NO. 8  | 2       | 0        | 0          | 2                | 0           | 0                           | 1                         | 1                         | 1                         | 0                         | 0               | 0                     | 0             | 0            | 0                 |
| NO. PLANTS MFG. PRODUCT   | 1       | —        | —          | 1                | —           | —                           | 1                         | 0                         | 0                         | —                         | —               | —                     | —             | —            | —                 |
| NO. LIMITED TO LESS THAN 90 DAYS PROD.  | 60      | —        | —          | 60               | —           | —                           | 60                        | 90                        | 90                        | —                         | —               | —                     | —             | —            | —                 |
| RANGE OF DAYS FOR LIMITED PLANTS  |         |          |            |                  |             |                             |                           |                           |                           |                           |                 |                       |               |              |                   |

\* Weighted average for U. S. based on average capacity of plants within each classification.

\*\* No NEL Plants are located in OCDM Region #1.

TABLE 1

U. S. REFINERIES BY SIZE GROUPS\*  
 REPORTED IN NATIONAL PETROLEUM COUNCIL'S 1960 SURVEY OF  
REFINERY MAINTENANCE AND CHEMICAL REQUIREMENTS

| <u>OCDM REGION NO.</u>     | <u>LESS THAN<br/>9,900<br/>BBLs./CD</u> | <u>10,000 TO<br/>49,900<br/>BBLs./CD</u> | <u>50,000 TO<br/>99,000<br/>BBLs./CD</u> | <u>100,000 TO<br/>199,900<br/>BBLs./CD</u> | <u>MORE THAN<br/>200,000<br/>BBLs./CD</u> | <u>TOTAL<br/>NUMBER<br/>REFINERIES</u> |
|----------------------------|---|--|--|--|---|--|
| 1                          | 3                                       | 5  | 4  | 1  | 0   | 13                                     |
| 2                          | 18                                      | 14                                       | 2  | 6  | 0   | 40                                     |
| 3                          | 9                                       | 1  | 0  | 0  | 0   | 10                                     |
| 4                          | 16                                      | 18                                       | 4  | 2  | 1   | 41                                     |
| 5                          | 37                                      | 33                                       | 10                                       | 5  | 5   | 90                                     |
| 6                          | 15                                      | 20                                       | 2  | 0  | 0   | 37                                     |
| 7                          | 19                                      | 10                                       | 3  | 6  | 0   | 38                                     |
| 8                          | 8                                       | 6  | 1  | 0  | 0   | 15                                     |
| <u>TOTAL UNITED STATES</u> | <u>125</u>                              | <u>107</u>                               | <u>26</u>                                | <u>20</u>                                  | <u>6</u>                                  | <u>284</u>                             |

\* REFINERY SIZES BASED ON CRUDE OIL CHARGE IN BARRELS PER CALENDAR DAY.

U. S. NATURAL GASOLINE PLANTS BY SIZE GROUPS\*  
 REPORTED IN NATIONAL PETROLEUM COUNCIL'S 1960 SURVEY OF  
NATURAL GASOLINE PLANT MAINTENANCE AND CHEMICAL REQUIREMENTS

| <u>OCDM REGION NO.</u>     | <u>LESS THAN<br/>499<br/>BBLs./DAY</u> | <u>500 TO<br/>999<br/>BBLs./DAY</u> | <u>1,000 TO<br/>1,999<br/>BBLs./DAY</u> | <u>2,000 TO<br/>2,999<br/>BBLs./DAY</u> | <u>3,000 TO<br/>4,999<br/>BBLs./DAY</u> | <u>MORE THAN<br/>5,000<br/>BBLs./DAY</u> | <u>TOTAL<br/>NUMBER<br/>PLANTS</u> |
|----------------------------|--|-------------------------------------|---|---|---|--|------------------------------------|
| 1                          | 0                                      | 0                                   | 0                                       | 0                                       | 0                                       | 0  | 0                                  |
| 2                          | 10                                     | 2                                   | 1                                       | 0                                       | 1                                       | 3  | 17                                 |
| 3                          | 1                                      | 2                                   | 1                                       | 0                                       | 0                                       | 0  | 4                                  |
| 4                          | 1                                      | 2                                   | 1                                       | 0                                       | 0                                       | 0  | 4                                  |
| 5                          | 85                                     | 64                                  | 82                                      | 48                                      | 43                                      | 46                                       | 368                                |
| 6                          | 15                                     | 6                                   | 9                                       | 2                                       | 2                                       | 2  | 36                                 |
| 7                          | 19                                     | 6                                   | 20                                      | 7                                       | 5                                       | 4  | 61                                 |
| 8                          | 0                                      | 1                                   | 1                                       | 0                                       | 0                                       | 0  | 2                                  |
| <u>TOTAL UNITED STATES</u> | <u>131</u>                             | <u>83</u>                           | <u>115</u>                              | <u>57</u>                               | <u>51</u>                               | <u>55</u>                                | <u>492</u>                         |

\* NATURAL GASOLINE PLANT SIZES BASED ON BARRELS PER DAY OF LIQUID RECOVERY.

Report of National Petroleum Council's Committee on Petroleum Refinery Maintenance and Chemical Requirements (1960) dated February 7, 1961.



# ERRATUM SHEET

Please insert the following corrected Table in lieu of Table 7-A (Cracking Catalysts)

CATEGORY: CATALYSTS

## R E F I N E R I E S

| NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD | AVERAGE<br>PLANT<br>INVENTORY | DAYS'<br>SUPPLY <u>1/</u><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--------------------------------------|-------------------------|-------------------------------|-------------------------------------|---|--|
|--------------------------------------|-------------------------|-------------------------------|-------------------------------------|---|--|

### A. CRACKING CATALYSTS

| OCDM REGION NO.            |            | (Pounds)         | (Pounds)          |           |           |          |
|----------------------------|------------|------------------|-------------------|-----------|-----------|----------|
| 1                          | 8          | 60,200           | 2,596,600         | 43        | 9         | 1 & 2    |
| 2                          | 18         | 194,463          | 7,315,400         | 38        | 10        | 4 & 2    |
| 3                          | 1          | 14,000           | 60,000            | 4         | 10        | 7        |
| 4                          | 22         | 148,101          | 5,657,800         | 38        | 11        | 4 & 2    |
| 5                          | 48         | 486,171          | 16,210,958        | 33        | 10        | 5 & 7    |
| 6                          | 22         | 73,019           | 2,903,600         | 40        | 10        | 4, 5 & 7 |
| 7                          | 12         | 118,193          | 6,454,966         | 55        | 14        | 7        |
| 8                          | 7          | 29,930           | 760,000           | 25        | 19        | 5 & 7    |
| <u>TOTAL UNITED STATES</u> | <u>138</u> | <u>1,124,077</u> | <u>41,959,324</u> | <u>37</u> | <u>11</u> |          |

### TOTALS BY REFINERY SIZE: (Bbls. per calendar day)

|              |         |    |         |            |    |    |
|--------------|---------|----|---------|------------|----|----|
| Less than    | 9,900   | 7  | 6,118   | 485,276    | 79 | 10 |
| 10 -         | 49,900  | 82 | 284,055 | 10,637,282 | 37 | 10 |
| 50 -         | 99,900  | 23 | 231,859 | 8,676,800  | 37 | 11 |
| 100 -        | 199,900 | 20 | 386,845 | 13,720,966 | 35 | 12 |
| 200,000 plus |         | 6  | 215,200 | 8,439,000  | 39 | 14 |

## TABLE 7

## REFINERIES

Report of National Petroleum Council's Committee on Petroleum Refinery Maintenance and Chemical Requirements (1960) dated February 7, 1961.

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 7 (Cont'd)

CATEGORY: CATALYSTS (Continued)

REFINERIES

|  | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--|--------------------------------------|-------------------------------------|---|---|---|--|
| <b>D. <u>HF ALKYLATION</u></b>                       |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 1                                    | 2,880                               | 90,000                                    | 31                                      | 4   | 1  |
| 2  | 2                                    | 1,638                               | 120,000                                   | 73                                      | 6   | 1 & 2  |
| 3  | 1                                    | 280                                 | 12,000                                    | 43                                      | 2   | 2  |
| 4  | 4                                    | 2,141                               | 178,730                                   | 83                                      | 6   | 4  |
| 5  | 11                                   | 7,143                               | 492,010                                   | 69                                      | 6   | 5  |
| 6  | 6                                    | 3,925                               | 295,800                                   | 75                                      | 10  | 5  |
| 7  | 2                                    | 6,370                               | 184,516                                   | 29                                      | 12  | 5 & 2  |
| 8  | 1                                    | 915                                 | 33,000                                    | 36                                      | 20  | 5  |
| <u>TOTAL UNITED STATES</u>                           | <u>28</u>                            | <u>25,292</u>                       | <u>1,406,056</u>                          | <u>56</u>                               | <u>7</u>                                  |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 2                                    | 500                                 | 70,000                                    | 140                                     | 13  |  |
| 10 - 49,900  | 19                                   | 9,704                               | 661,540                                   | 68                                      | 7   |  |
| 50 - 99,900  | 4                                    | 7,480                               | 390,000                                   | 52                                      | 6   |  |
| 100 - 199,900  | 3                                    | 7,608                               | 284,516                                   | 37                                      | 9   |  |
| 200,000 plus   | 0                                    | -                                   | -   | -                                       | -   |  |
| <b>E. <u>ISOMERIZATION</u></b>                       |                                      |                                     |   |   |   |  |
| (a) ALUMINUM CHLORIDE                                | 14                                   | 13,444                              | 428,280                                   | 32                                      | 15  | 5 & 2  |
| (b) ANTIMONY TRICHLORIDE                             | 3                                    | 463                                 | 75,000                                    | 162                                     | 29  | 1  |
| (c) BAUXITE  | 3                                    | 750                                 | 240,000                                   | 320                                     | 11  | 5  |
| (d) HYDROGEN CHLORIDE                                | 10                                   | 1,675                               | 35,200                                    | 21                                      | 6   | 7 & 6  |
| (e) POROCEL  | 5                                    | 1,095                               | 231,500                                   | 211                                     | 20  | 5  |
| (f) OTHER  | 2                                    | 390                                 | 86,000                                    | 220                                     | 11  | 4  |
| <u>TOTAL UNITED STATES</u>                           | <u>37</u>                            | <u>17,817</u>                       | <u>1,095,980</u>                          | <u>62</u>                               | <u>14</u>                                 |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 0                                    | -                                   | -   | -                                       | -   |  |
| 10 - 49,900  | 11                                   | 2,236                               | 208,380                                   | 93                                      | 13  |  |
| 50 - 99,900  | 16                                   | 13,465                              | 705,100                                   | 52                                      | 12  |  |
| 100 - 199,900  | 9                                    | 1,416                               | 167,500                                   | 118                                     | 21  |  |
| 200,000 plus   | 1                                    | 700                                 | 15,000                                    | 21                                      | 2   |  |

<sup>1/</sup> Calculated



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 7 (Cont'd)

CATEGORY: CATALYSTS (Continued)

R E F I N E R I E S

|                                   | NUMBER OF<br>REFINERIES<br>REPORTING | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (s)<br>OF SUPPLY<br>(OCDM Regions) |
|-----------------------------------|--------------------------------------|---|--|
| <b>F. <u>REFORMING</u></b>        |                                      |   |  |
| OCDM REGION NO. 1                 | 3                                    | 3   | 1 & 5  |
| 2                                 | 14                                   | 20  | 1 & 4  |
| 3                                 | 0                                    | -   | -  |
| 4                                 | 23                                   | 16  | 4 & 5  |
| 5                                 | 54                                   | 23  | 5  |
| 6                                 | 24                                   | 29  | 2, 5 & 4   |
| 7                                 | 15                                   | 23  | 5  |
| 8                                 | 5                                    | 33  | 5 & 2  |
| <u>TOTAL UNITED STATES *</u>      | <u>138</u>                           | <u>23</u>                                 |  |
| <b>G. <u>DESULPHURIZATION</u></b> |                                      |   |  |
| OCDM REGION NO. 1                 | 5                                    | 22  | 4 & 1  |
| 2                                 | 12                                   | 15  | 2 & 4  |
| 3                                 | 0                                    | -   | -  |
| 4                                 | 20                                   | 11  | 4  |
| 5                                 | 34                                   | 21  | 4, 5 & 1   |
| 6                                 | 14                                   | 20  | 4, 5 & 2   |
| 7                                 | 7                                    | 36  | 4 & 2  |
| 8                                 | 6                                    | 28  | 4 & 7  |
| <u>TOTAL UNITED STATES *</u>      | <u>98</u>                            | <u>20</u>                                 |  |
| <b>H. <u>HYDROGENATION</u></b>    |                                      |   |  |
| OCDM REGION NO. 1                 | 0                                    | -   | -  |
| 2                                 | 5                                    | 16  | 4 & 2  |
| 3                                 | 0                                    | -   | -  |
| 4                                 | 2                                    | 46  | 4 & 2  |
| 5                                 | 5                                    | 26  | 5 & 2  |
| 6                                 | 1                                    | 14  | 2  |
| 7                                 | 1                                    | 5   | 7  |
| 8                                 | 1                                    | 30  | 4  |
| <u>TOTAL UNITED STATES *</u>      | <u>15</u>                            | <u>24</u>                                 |  |

\* For the most part these Catalysts are used in fixed bed processes in which the Catalyst in the unit is normally replaced rather infrequently. For this reason the use of these type Catalysts are not generally referred to in requirements per stream day. In many instances no inventory is maintained in the plant other than the unit.

TABLE 8

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: CHEMICALS FOR MANUFACTURE OF LUBRICATING OILS, PETROLATUMS AND WAXES

REFINERIES

|  | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--|--------------------------------------|-------------------------------------|---|---|---|--|
| <b>A. MEK</b>  |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 2                                    | 5,779                               | 821,280                                   | 142                                     | 46  | 1  |
| 2  | 5                                    | 9,645                               | 373,821                                   | 39                                      | 11  | 1 & 2  |
| 3  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4  | 2                                    | 2,673                               | 75,140                                    | 28                                      | 19  | 4 & 1  |
| 5  | 10                                   | 18,577                              | 3,152,279                                 | 170                                     | 7   | 5  |
| 6  | 2                                    | 1,452                               | 378,654                                   | 261                                     | 20  | 1 & 6  |
| 7  | 3                                    | 3,814                               | 87,572                                    | 23                                      | 15  | 7  |
| 8  | 0                                    | -                                   | -   | -                                       | -   | -  |
| <b>TOTAL UNITED STATES</b>                           | <b>24</b>                            | <b>41,940</b>                       | <b>4,888,746</b>                          | <b>117</b>                              | <b>14</b>                                 |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 3                                    | 1,050                               | 85,297                                    | 81                                      | 13  |  |
| 10 - 49,900  | 7                                    | 7,435                               | 1,687,367                                 | 227                                     | 26  |  |
| 50 - 99,900  | 4                                    | 5,558                               | 699,362                                   | 126                                     | 6   |  |
| 100 - 199,900  | 5                                    | 15,032                              | 415,630                                   | 28                                      | 10  |  |
| 200,000 plus   | 5                                    | 12,865                              | 2,001,090                                 | 156                                     | 11  |  |
| <b>B. PHENOL</b>                                     |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 1                                    | 2,500                               | 250,000                                   | 100                                     | 5   | 2  |
| 2  | 5                                    | 5,132                               | 845,264                                   | 165                                     | 6   | 2  |
| 3  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4  | 3                                    | 2,209                               | 297,040                                   | 134                                     | 22  | 5 & 4  |
| 5  | 11                                   | 25,481                              | 2,135,380                                 | 84                                      | 12  | 3 & 2  |
| 6  | 1                                    | 230                                 | 40,000                                    | 174                                     | 10  | 4  |
| 7  | 1                                    | 1,133                               | 4,500                                     | 4                                       | 14  | 7  |
| 8  | 0                                    | -                                   | -   | -                                       | -   | -  |
| <b>TOTAL UNITED STATES</b>                           | <b>22</b>                            | <b>36,685</b>                       | <b>3,572,184</b>                          | <b>97</b>                               | <b>12</b>                                 |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 3                                    | 370                                 | 105,480                                   | 285                                     | 5   |  |
| 10 - 49,900  | 4                                    | 5,148                               | 544,380                                   | 106                                     | 15  |  |
| 50 - 99,900  | 4                                    | 4,736                               | 1,045,500                                 | 221                                     | 7   |  |
| 100 - 199,900  | 6                                    | 6,939                               | 994,784                                   | 143                                     | 13  |  |
| 200,000 plus   | 5                                    | 19,492                              | 882,040                                   | 45                                      | 16  |  |
| <b>C. FURFURAL</b>                                   |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 1                                    | 2,750                               | 200,000                                   | 73                                      | 2   | 1  |
| 2  | 4                                    | 4,404                               | 470,501                                   | 107                                     | 12  | 6  |
| 3  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 5  | 5                                    | 19,980                              | 3,153,320                                 | 158                                     | 12  | 3  |
| 6  | 2                                    | 1,465                               | 589,004                                   | 402                                     | 18  | 6  |
| 7  | 2                                    | 1,586                               | 227,120                                   | 143                                     | 13  | 6  |
| 8  | 0                                    | -                                   | -   | -                                       | -   | -  |
| <b>TOTAL UNITED STATES</b>                           | <b>14</b>                            | <b>30,185</b>                       | <b>4,639,945</b>                          | <b>154</b>                              | <b>12</b>                                 |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 2                                    | 907                                 | 160,410                                   | 177                                     | 11  |  |
| 10 - 49,900  | 4                                    | 4,299                               | 925,855                                   | 215                                     | 15  |  |
| 50 - 99,900  | 3                                    | 4,278                               | 450,000                                   | 105                                     | 9   |  |
| 100 - 199,900  | 2                                    | 2,861                               | 252,800                                   | 88                                      | 8   |  |
| 200,000 plus   | 3                                    | 17,840                              | 2,850,880                                 | 160                                     | 15  |  |

<sup>1/</sup> Calculated

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: CHEMICALS FOR MANUFACTURE OF LUBRICATING OILS, PETROLATUMS AND WAXES (Continued)

REFINERIES

|  | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--|--------------------------------------|-------------------------------------|---|---|---|--|
| D. <u>SULPHURIC ACID</u>                             |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 0                                    | -                                   | -   | -                                       | -   | -  |
| 2  | 2                                    | 3,380                               | 59,150                                    | 18                                      | 2   | 2  |
| 3  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4  | 2                                    | 120,845                             | 336,900                                   | 3                                       | 2   | 4  |
| 5  | 4                                    | 280,312                             | 2,351,000                                 | 8                                       | 1   | 5  |
| 6  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 7  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 8  | 0                                    | -                                   | -   | -                                       | -   | -  |
| <u>TOTAL UNITED STATES</u>                           | <u>8</u>                             | <u>404,537</u>                      | <u>2,747,050</u>                          | <u>7</u>                                | <u>2</u>                                  |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 3                                    | 19,109                              | 179,450                                   | 9                                       | 2   |  |
| 10 - 49,900  | 2                                    | 70,845                              | 616,900                                   | 9                                       | 2   |  |
| 50 - 99,900  | 0                                    | -                                   | -   | -                                       | -   |  |
| 100 - 199,900  | 2                                    | 194,583                             | 1,630,700                                 | 8                                       | 2   |  |
| 200,000 plus   | 1                                    | 120,000                             | 320,000                                   | 3                                       | 1   |  |

<sup>1/</sup> Calculated





TABLE 10 (cont'd)

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

## CATEGORY: CHEMICALS FOR TREATING (GASES &amp; LIQUIDS)

## REFINERIES

|  | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (s)<br>OF SUPPLY<br>(OCDM Regions) |
|--|--------------------------------------|-------------------------------------|---|---|---|--|
| <b>D. LITHARGE</b>                                   |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 3                                    | 66                                  | 13,200                                    | 200                                     | 4   | 1  |
| 2  | 7                                    | 377                                 | 49,758                                    | 132                                     | 11  | 2  |
| 3  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4  | 22                                   | 2,836                               | 195,675                                   | 69                                      | 8   | 4 & 6  |
| 5  | 34                                   | 5,960                               | 408,100                                   | 68                                      | 9   | 5  |
| 6  | 10                                   | 554                                 | 76,850                                    | 139                                     | 8   | 6 & 4  |
| 7  | 9                                    | 1,315                               | 90,670                                    | 69                                      | 5   | 7  |
| 8  | 4                                    | 69                                  | 8,092                                     | 117                                     | 14  | 8  |
| <b>TOTAL UNITED STATES</b>                           | <b>89</b>                            | <b>11,177</b>                       | <b>842,345</b>                            | <b>75</b>                               | <b>8</b>                                  |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 18                                   | 262                                 | 25,887                                    | 99                                      | 9   |  |
| 10 - 49,900  | 40                                   | 3,402                               | 234,633                                   | 69                                      | 7   |  |
| 50 - 99,900  | 15                                   | 2,059                               | 147,225                                   | 72                                      | 7   |  |
| 100 - 199,900  | 11                                   | 2,077                               | 256,000                                   | 123                                     | 11  |  |
| 200,000 plus   | 5                                    | 3,377                               | 178,600                                   | 53                                      | 12  |  |
| <b>E. SULPHUR</b>                                    |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 1                                    | 250                                 | 10,000                                    | 40                                      | 1   | 1  |
| 2  | 10                                   | 20,904                              | 674,924                                   | 32                                      | 7   | 2  |
| 3  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4  | 20                                   | 5,221                               | 237,734                                   | 46                                      | 7   | 4  |
| 5  | 35                                   | 44,432                              | 3,412,950                                 | 77                                      | 8   | 5  |
| 6  | 14                                   | 2,821                               | 177,150                                   | 63                                      | 7   | 6 & 5  |
| 7  | 6                                    | 1,125                               | 51,600                                    | 46                                      | 4   | 7  |
| 8  | 3                                    | 137                                 | 8,800                                     | 64                                      | 17  | 8  |
| <b>TOTAL UNITED STATES</b>                           | <b>89</b>                            | <b>74,890</b>                       | <b>4,573,158</b>                          | <b>61</b>                               | <b>7</b>                                  |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |   |   |  |
| Less than 9,900                                      | 21                                   | 21,449                              | 590,391                                   | 28                                      | 9   |  |
| 10 - 49,900  | 44                                   | 6,398                               | 367,043                                   | 57                                      | 6   |  |
| 50 - 99,900  | 13                                   | 4,227                               | 213,524                                   | 51                                      | 8   |  |
| 100 - 199,900  | 7                                    | 38,756                              | 3,149,200                                 | 81                                      | 13  |  |
| 200,000 plus   | 4                                    | 4,060                               | 253,000                                   | 62                                      | 14  |  |
| <b>F. CAUSTIC POTASH</b>                             |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 2                                    | 1,540                               | 258,900                                   | 168                                     | 5   | 2 & 1  |
| 2  | 1                                    | 20                                  | 10,000                                    | 500                                     | 30  | 2  |
| 3  | 1                                    | 300                                 | 15,000                                    | 50                                      | 5   | 3  |
| 4  | 4                                    | 5,591                               | 159,600                                   | 29                                      | 8   | 1  |
| 5  | 12                                   | 4,091                               | 257,650                                   | 63                                      | 6   | 5  |
| 6  | 3                                    | 615                                 | 124,550                                   | 203                                     | 6   | 1 & 6  |
| 7  | 3                                    | 4,195                               | 82,050                                    | 20                                      | 3   | 7  |
| 8  | 2                                    | 828                                 | 46,150                                    | 56                                      | 11  | 7  |
| <b>TOTAL UNITED STATES</b>                           | <b>28</b>                            | <b>17,180</b>                       | <b>953,900</b>                            | <b>56</b>                               | <b>7</b>                                  |  |
| <b>G. SODA ASH</b>                                   |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1                                    | 1                                    | 4,000                               | 60,000                                    | 15                                      | 7   | 2  |
| 2  | 3                                    | 19,105                              | 332,000                                   | 17                                      | 9   | 1 & 2  |
| 3  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4  | 1                                    | 50                                  | 2,500                                     | 50                                      | 5   | 1  |
| 5  | 9                                    | 3,357                               | 328,590                                   | 98                                      | 4   | 5  |
| 6  | 0                                    | -                                   | -   | -                                       | -   | -  |
| 7  | 1                                    | 600                                 | 29,000                                    | 48                                      | 5   | 7  |
| 8  | 1                                    | 100                                 | 5,000                                     | 50                                      | 12  | 6  |
| <b>TOTAL UNITED STATES</b>                           | <b>16</b>                            | <b>27,212</b>                       | <b>757,090</b>                            | <b>28</b>                               | <b>6</b>                                  |  |

<sup>1/</sup> Calculated



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 10

CATEGORY: CHEMICALS FOR TREATING (GASES & LIQUIDS)

REFINERIES

NATURAL GASOLINE PLANTS

|                               |  | NUMBER OF<br>REFINERIES<br>REPORTING                   | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY 1/<br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |  |  | NUMBER OF<br>NGL PLANTS<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY<br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------------|--|--|-------------------------------------|---|------------------------------|---|--|--|--|--------------------------------------|-------------------------------------|---|---------------------------|---|--|-----|-------|----|----|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| A. SODIUM HYDROXIDE (Caustic) |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 148,025                             | 4,241,900                                 | 29                           | 5   | 1  |  |  | TOTAL UNITED STATES                  | 31,170                              | 587,208                                   | 22                        | 7   | 5  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 110,861                             | 3,425,355                                 | 31                           | 7   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | 2,860                               | 49,100                                    | 17                           | 1   | 3  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 123,071                             | 4,440,492                                 | 36                           | 9   | 4  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 540,663                             | 13,653,038                                | 25                           | 5   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 40,909                              | 1,593,237                                 | 39                           | 6   | 6 & 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 233,343                             | 4,600,403                                 | 20                           | 4   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 23,324                              | 563,384                                   | 24                           | 9   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 11   | 23,324                              | 563,384                                   | 24                           | 9   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 206  | 1,223,056                           | 32,566,909                                | 27                           | 6   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day)   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 9,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 10 - 49,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 50 - 99,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 100 - 199,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 200,000 plus   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 63   | 27,342                              | 1,240,109                                 | 45                           | 6   |  |  |  | TOTAL UNITED STATES                  | 453                                 | 33,265                                    | 73                        | 6   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 93   | 196,699                             | 5,581,095                                 | 28                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 25   | 261,560                             | 7,536,042                                 | 29                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 19   | 435,410                             | 11,156,263                                | 26                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 302,045                             | 7,053,400                                 | 23                           | 6   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5,000 plus   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 15   | 453                                 | 33,265                                    | 73                           | 6   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 15   | 1,059                               | 44,890                                    | 42                           | 9   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 38   | 8,492                               | 95,910                                    | 11                           | 7   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 18   | 5,807                               | 39,125                                    | 7                            | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 17   | 921                                 | 89,288                                    | 97                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 21   | 15,038                              | 384,730                                   | 26                           | 7   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 86   | 24,495                              | 905,594                                   | 37                           | 6   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| B. ETHANOLAMINES              |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 1,475                               | 157,740                                   | 107                          | 6   | 1  |  |  | TOTAL UNITED STATES                  | 24,495                              | 905,594                                   | 37                        | 6   | 5  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 3,782                               | 226,218                                   | 60                           | 8   | 2 & 1  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | -                                   | -   | -                            | -   | -  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 1,747                               | 215,048                                   | 123                          | 9   | 4  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 5,402                               | 284,985                                   | 53                           | 8   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 732                                 | 129,484                                   | 176                          | 7   | 6 & 4  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 3,488                               | 421,252                                   | 121                          | 6   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 782                                 | 37,460                                    | 48                           | 9   | 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 98   | 17,408                              | 1,473,187                                 | 85                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day)   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 9,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 10 - 49,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 50 - 99,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 100 - 199,900  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 200,000 plus   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 14   | 233                                 | 32,726                                    | 140                          | 5   |  |  |  | TOTAL UNITED STATES                  | 543                                 | 46,719                                    | 86                        | 7   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 48   | 3,957                               | 264,991                                   | 67                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 14   | 2,402                               | 270,320                                   | 113                          | 7   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 18   | 7,581                               | 731,150                                   | 96                           | 9   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 3,235                               | 173,000                                   | 53                           | 12  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5,000 plus   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 11   | 543                                 | 46,719                                    | 86                           | 7   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 10   | 3,471                               | 45,771                                    | 13                           | 7   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 22   | 2,994                               | 237,491                                   | 79                           | 9   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 9  | 14,107                              | 76,840                                    | 5                            | 4   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 16   | 1,124                               | 234,933                                   | 209                          | 3   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 18   | 2,256                               | 263,840                                   | 117                          | 6   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 31   | 10,103                              | 173,102                                   | 17                           | 17  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C. COPPER CHLORIDE SWEETENING |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 10                                  | 600                                       | 60                           | 2   | 1  |  |  | TOTAL UNITED STATES                  | 187                                 | 7,700                                     | 41                        | 21  | 5  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 151                                 | 15,120                                    | 100                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | -                                   | -   | -                            | -   | -  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 679                                 | 69,570                                    | 102                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,055                               | 23,630                                    | 11                           | 9   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 289                                 | 21,420                                    | 74                           | 8   | 2 & 6  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 70                                  | 4,000                                     | 57                           | 3   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 95                                  | 10,600                                    | 112                          | 21  | 5 & 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 3,349                               | 144,900                                   | 43                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 48   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 187                                 | 7,700                                     | 41                           | 5   |  |  |  | TOTAL UNITED STATES                  | 2,642                               | 14,100                                    | 5                         | 16  |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,642                               | 31,502                                    | 65                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 9  | 481                                 | 10,000                                    | 370                          | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 27                                  | 51,300                                    | 298                          | 22  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 172                                 | 58,500                                    | 9                            | 13  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 31   | 10,103                              | 173,102                                   | 17                           | 17  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C. COPPER CHLORIDE SWEETENING |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 10                                  | 600                                       | 60                           | 2   | 1  |  |  |                                      |                                     |   |                           |   | TOTAL UNITED STATES                                | 187 | 7,700 | 41 | 21 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 151                                 | 15,120                                    | 100                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | -                                   | -   | -                            | -   | -  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 679                                 | 69,570                                    | 102                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,055                               | 23,630                                    | 11                           | 9   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 289                                 | 21,420                                    | 74                           | 8   | 2 & 6  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 70                                  | 4,000                                     | 57                           | 3   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 95                                  | 10,600                                    | 112                          | 21  | 5 & 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 3,349                               | 144,900                                   | 43                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 48   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 187                                 | 7,700                                     | 41                           | 5   |  |  |  | TOTAL UNITED STATES                  | 2,642                               | 14,100                                    | 5                         | 16  |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,642                               | 31,502                                    | 65                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 9  | 481                                 | 10,000                                    | 370                          | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 27                                  | 51,300                                    | 298                          | 22  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 172                                 | 58,500                                    | 9                            | 13  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 31   | 10,103                              | 173,102                                   | 17                           | 17  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C. COPPER CHLORIDE SWEETENING |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 10                                  | 600                                       | 60                           | 2   | 1  |  |  |                                      |                                     |   |                           |   | TOTAL UNITED STATES                                | 187 | 7,700 | 41 | 21 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 151                                 | 15,120                                    | 100                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | -                                   | -   | -                            | -   | -  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 679                                 | 69,570                                    | 102                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,055                               | 23,630                                    | 11                           | 9   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 289                                 | 21,420                                    | 74                           | 8   | 2 & 6  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 70                                  | 4,000                                     | 57                           | 3   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 95                                  | 10,600                                    | 112                          | 21  | 5 & 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 3,349                               | 144,900                                   | 43                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 48   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 187                                 | 7,700                                     | 41                           | 5   |  |  |  | TOTAL UNITED STATES                  | 2,642                               | 14,100                                    | 5                         | 16  |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,642                               | 31,502                                    | 65                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 9  | 481                                 | 10,000                                    | 370                          | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 27                                  | 51,300                                    | 298                          | 22  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 172                                 | 58,500                                    | 9                            | 13  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 31   | 10,103                              | 173,102                                   | 17                           | 17  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C. COPPER CHLORIDE SWEETENING |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 10                                  | 600                                       | 60                           | 2   | 1  |  |  |                                      |                                     |   |                           |   | TOTAL UNITED STATES                                | 187 | 7,700 | 41 | 21 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 151                                 | 15,120                                    | 100                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | -                                   | -   | -                            | -   | -  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 679                                 | 69,570                                    | 102                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,055                               | 23,630                                    | 11                           | 9   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 289                                 | 21,420                                    | 74                           | 8   | 2 & 6  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 70                                  | 4,000                                     | 57                           | 3   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 95                                  | 10,600                                    | 112                          | 21  | 5 & 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 3,349                               | 144,900                                   | 43                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 48   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 187                                 | 7,700                                     | 41                           | 5   |  |  |  | TOTAL UNITED STATES                  | 2,642                               | 14,100                                    | 5                         | 16  |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,642                               | 31,502                                    | 65                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 9  | 481                                 | 10,000                                    | 370                          | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 27                                  | 51,300                                    | 298                          | 22  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 172                                 | 58,500                                    | 9                            | 13  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 31   | 10,103                              | 173,102                                   | 17                           | 17  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C. COPPER CHLORIDE SWEETENING |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 10                                  | 600                                       | 60                           | 2   | 1  |  |  |                                      |                                     |   |                           |   | TOTAL UNITED STATES                                | 187 | 7,700 | 41 | 21 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 151                                 | 15,120                                    | 100                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | -                                   | -   | -                            | -   | -  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 679                                 | 69,570                                    | 102                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,055                               | 23,630                                    | 11                           | 9   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 289                                 | 21,420                                    | 74                           | 8   | 2 & 6  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 70                                  | 4,000                                     | 57                           | 3   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 95                                  | 10,600                                    | 112                          | 21  | 5 & 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 3,349                               | 144,900                                   | 43                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 48   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 187                                 | 7,700                                     | 41                           | 5   |  |  |  | TOTAL UNITED STATES                  | 2,642                               | 14,100                                    | 5                         | 16  |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,642                               | 31,502                                    | 65                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 9  | 481                                 | 10,000                                    | 370                          | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 27                                  | 51,300                                    | 298                          | 22  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 172                                 | 58,500                                    | 9                            | 13  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 31   | 10,103                              | 173,102                                   | 17                           | 17  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C. COPPER CHLORIDE SWEETENING |  |  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OCDM REGION NO.               |  | 1  | 10                                  | 600                                       | 60                           | 2   | 1  |  |  |                                      |                                     |   |                           |   | TOTAL UNITED STATES                                | 187 | 7,700 | 41 | 21 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 151                                 | 15,120                                    | 100                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3  | -                                   | -   | -                            | -   | -  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 4  | 679                                 | 69,570                                    | 102                          | 8   | 2  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,055                               | 23,630                                    | 11                           | 9   | 5  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 6  | 289                                 | 21,420                                    | 74                           | 8   | 2 & 6  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 7  | 70                                  | 4,000                                     | 57                           | 3   | 7  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 8  | 95                                  | 10,600                                    | 112                          | 21  | 5 & 8  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 3,349                               | 144,900                                   | 43                           | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 48   |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | Less than 499  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 500 - 999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 1,000 - 1,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2,000 - 2,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 3,000 - 4,999  |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 187                                 | 7,700                                     | 41                           | 5   |  |  |  | TOTAL UNITED STATES                  | 2,642                               | 14,100                                    | 5                         | 16  |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 2,642                               | 31,502                                    | 65                           | 5   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 9  | 481                                 | 10,000                                    | 370                          | 8   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 2  | 27                                  | 51,300                                    | 298                          | 22  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 5  | 172                                 | 58,500                                    | 9                            | 13  |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | TOTAL UNITED STATES                                    |                                     |   |                              |   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                               |  | 31   | 10,103                              | 173,102                                   | 17                           | 1   |  |  |  |                                      |                                     |   |                           |   |  |     |       |    |    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: CHEMICALS FOR TREATING (GASES & LIQUIDS)

N A T U R A L   G A S O L I N E   P L A N T S

|  | NUMBER OF<br>NGL PLANTS<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Gallons) | AVERAGE<br>PLANT<br>INVENTORY<br>(Gallons) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--|--------------------------------------|--------------------------------------|--|---|---|--|
| H. <u>ETHYLENE GLYCOLS</u>                             |                                      |                                      |  |   |   |  |
| <u>TOTAL UNITED STATES</u>                             | <u>180</u>                           | <u>3,574</u>                         | <u>340,901</u>                             | <u>95</u>                               | <u>7</u>                                  | 5  |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                      |                                      |  |   |   |  |
| Less than 499  | 37                                   | 87                                   | 13,387                                     | 154                                     | 7   |  |
| 500 - 999  | 31                                   | 1,617                                | 191,007                                    | 118                                     | 9   |  |
| 1,000 - 1,999  | 54                                   | 798                                  | 53,181                                     | 67                                      | 7   |  |
| 2,000 - 2,999  | 16                                   | 75                                   | 5,166                                      | 69                                      | 8   |  |
| 3,000 - 4,999  | 20                                   | 288                                  | 35,367                                     | 123                                     | 6   |  |
| 5,000 plus   | 22                                   | 709                                  | 42,793                                     | 60                                      | 8   |  |

<sup>1/</sup> Calculated

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 11

CATEGORY: WATER TREATING COMPOUNDS & CHEMICALS

REFINERIES

| SALT | NUMBER OF REFINERIES REPORTING |  | NORMAL USE PER/SD (Pounds) |  | AVERAGE PLANT INVENTORY (Pounds) |  | DAYS' SUPPLY (Days) |  | EST. NORMAL DELIVERY TIME (Days) |  | MAJOR SOURCE OF SUPPLY (OCDM Regions) |  |
|------|--------------------------------|--|----------------------------|--|----------------------------------|--|---------------------|--|----------------------------------|--|---------------------------------------|--|
|      |                                |  |                            |  |                                  |  |                     |  |                                  |  |                                       |  |

|                     |     |         |           |     |    |       |
|---------------------|-----|---------|-----------|-----|----|-------|
| OCDM REGION NO. 1   | 6   | 16,925  | 422,700   | 25  | 3  | 1     |
| 2                   | 18  | 58,436  | 2,534,767 | 43  | 7  | 2     |
| 3                   | 3   | 327     | 40,000    | 122 | 6  | 3 & 5 |
| 4                   | 12  | 20,391  | 355,000   | 17  | 7  | 4 & 6 |
| 5                   | 28  | 63,132  | 1,844,128 | 29  | 4  | 5     |
| 6                   | 17  | 26,217  | 981,850   | 37  | 7  | 6 & 7 |
| 7                   | 18  | 30,646  | 657,300   | 21  | 4  | 7     |
| 8                   | 6   | 4,050   | 245,717   | 61  | 10 |       |
| TOTAL UNITED STATES | 108 | 220,124 | 7,081,462 | 32  | 6  |       |

TOTALS BY REFINERY SIZE:  
(Bbls. per calendar day)  
Less than 9,900  
10 - 49,900  
50 - 99,900  
100 - 199,900  
200,000 plus

TOTALS BY NGL PLANT SIZE:  
(Bbls./D Liquid Recovery)  
Less than 499  
500 - 999  
1,000 - 1,999  
2,000 - 2,999  
3,000 - 4,999  
5,000 plus

B. CHLORINE

|                     |    |        |         |    |   |       |
|---------------------|----|--------|---------|----|---|-------|
| OCDM REGION NO. 1   | 4  | 3,850  | 132,000 | 34 | 9 | 1 & 2 |
| 2                   | 7  | 3,558  | 97,108  | 27 | 7 | 2     |
| 3                   | 0  | -      | -       | -  | - | -     |
| 4                   | 6  | 3,075  | 115,000 | 37 | 9 | 4     |
| 5                   | 28 | 24,678 | 439,624 | 18 | 5 | 5     |
| 6                   | 11 | 807    | 63,904  | 79 | 6 | 6     |
| 7                   | 7  | 2,912  | 49,950  | 17 | 5 | 7     |
| 8                   | 3  | 52     | 2,450   | 47 | 8 | 8     |
| TOTAL UNITED STATES | 66 | 38,932 | 900,036 | 23 | 6 |       |

TOTALS BY REFINERY SIZE:  
(Bbls. per calendar day)  
Less than 9,900  
10 - 49,900  
50 - 99,900  
100 - 199,900  
200,000 plus

TOTALS BY NGL PLANT SIZE:  
(Bbls./D Liquid Recovery)  
Less than 499  
500 - 999  
1,000 - 1,999  
2,000 - 2,999  
3,000 - 4,999  
5,000 plus

C. LIME

|                     |     |         |           |    |    |       |
|---------------------|-----|---------|-----------|----|----|-------|
| OCDM REGION NO. 1   | 4   | 4,360   | 204,500   | 47 | 8  | 2     |
| 2                   | 18  | 20,089  | 503,087   | 25 | 6  | 2     |
| 3                   | 0   | -       | -         | -  | -  | -     |
| 4                   | 17  | 49,810  | 1,356,125 | 27 | 9  | 6 & 4 |
| 5                   | 28  | 69,711  | 1,764,383 | 25 | 7  | 5     |
| 6                   | 18  | 26,851  | 1,067,800 | 40 | 11 | 6 & 5 |
| 7                   | 10  | 24,775  | 565,000   | 20 | 10 | 7     |
| 8                   | 5   | 3,573   | 185,646   | 52 | 9  | 8     |
| TOTAL UNITED STATES | 100 | 199,189 | 5,646,541 | 28 | 8  |       |

TOTALS BY REFINERY SIZE:  
(Bbls. per calendar day)  
Less than 9,900  
10 - 49,900  
50 - 99,900  
100 - 199,900  
200,000 plus

TOTALS BY NGL PLANT SIZE:  
(Bbls./D Liquid Recovery)  
Less than 499  
500 - 999  
1,000 - 1,999  
2,000 - 2,999  
3,000 - 4,999  
5,000 plus

1/ Calculated



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: WATER TREATING COMPOUNDS & CHEMICALS (Continued)

TABLE 11 (cont'd)

| REFINERIES   |                                     |   |   |   |  |       | NATURAL GASOLINE PLANTS                                |                                     |   |   |   |  |                     |
|--|-------------------------------------|---|---|---|--|-------|--|-------------------------------------|---|---|---|--|---------------------|
| NUMBER OF<br>REFINERIES<br>REPORTING                 | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |       | NUMBER OF<br>NGL PLANTS<br>REPORTING                   | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |                     |
| <b>D. CHROMATES &amp; PHOSPHATES</b>                 |                                     |   |   |   |  |       | <b>D. CHROMATES &amp; PHOSPHATES</b>                   |                                     |   |   |   |  |                     |
| OCDM REGION NO. 1                                    | 9                                   | 1,089                                     | 59,300                                  | 54  | 8  | 1     |  |                                     |   |   |   |  |                     |
| 2  | 18                                  | 3,791                                     | 273,962                                 | 72  | 11   | 2     |  |                                     |   |   |   |  |                     |
| 3  | 4                                   | 180                                       | 1,250                                   | 7   | 16   | 3     |  |                                     |   |   |   |  |                     |
| 4  | 23                                  | 6,383                                     | 399,130                                 | 63  | 10   | 4     |  |                                     |   |   |   |  |                     |
| 5  | 42                                  | 15,387                                    | 670,735                                 | 44  | 9  | 5 & 4 |  |                                     |   |   |   |  |                     |
| 6  | 20                                  | 2,641                                     | 212,285                                 | 80  | 11   | 4 & 6 |  |                                     |   |   |   |  |                     |
| 7  | 26                                  | 3,915                                     | 115,800                                 | 30  | 6  | 7     |  |                                     |   |   |   |  |                     |
| 8  | 10                                  | 732                                       | 75,534                                  | 103                                       | 17   | 4 & 7 |  |                                     |   |   |   |  |                     |
| <b>TOTAL UNITED STATES</b>                           | <b>152</b>                          | <b>34,118</b>                             | <b>1,807,996</b>                        | <b>53</b>                                 | <b>10</b>  |       | <b>TOTAL UNITED STATES</b>                             | <b>255</b>                          | <b>9,173</b>                              | <b>463,728</b>                          | <b>51</b>                                 | <b>10</b>  | <b>5 &amp; 4</b>    |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                     |   |   |   |  |       | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |   |   |  |                     |
| Less than 9,900                                      | 38                                  | 858                                       | 67,858                                  | 79  | 10   |       | Less than 499  | 40                                  | 805                                       | 22,467                                  | 28  | 9  |                     |
| 10 - 49,900  | 72                                  | 14,250                                    | 724,958                                 | 51  | 9  |       | 500 - 999  | 39                                  | 1,976                                     | 60,085                                  | 30  | 10   |                     |
| 50 - 99,900  | 17                                  | 5,423                                     | 331,775                                 | 61  | 13   |       | 1,000 - 1,999  | 69                                  | 1,667                                     | 107,642                                 | 65  | 10   |                     |
| 100 - 199,900  | 19                                  | 11,308                                    | 540,155                                 | 48  | 7  |       | 2,000 - 2,999  | 40                                  | 2,045                                     | 60,509                                  | 30  | 11   |                     |
| 200,000 plus   | 6                                   | 2,279                                     | 143,250                                 | 63  | 11   |       | 3,000 - 4,999  | 33                                  | 847                                       | 54,520                                  | 64  | 9  |                     |
|  |                                     |   |   |   |  |       | 5,000 plus   | 34                                  | 1,833                                     | 158,505                                 | 86  | 11   |                     |
| <b>E. SODIUM SULFITE</b>                             |                                     |   |   |   |  |       | <b>E. SODIUM SULFITE</b>                               |                                     |   |   |   |  |                     |
| OCDM REGION NO. 1                                    | 5                                   | 300                                       | 23,000                                  | 77  | 7  | 2 & 1 |  |                                     |   |   |   |  |                     |
| 2  | 8                                   | 284                                       | 34,994                                  | 123                                       | 9  | 2     |  |                                     |   |   |   |  |                     |
| 3  | 1                                   | 5   | 450                                     | 90  | 21   | 6     |  |                                     |   |   |   |  |                     |
| 4  | 6                                   | 229                                       | 29,050                                  | 127                                       | 8  | 4 & 2 |  |                                     |   |   |   |  |                     |
| 5  | 25                                  | 2,098                                     | 105,500                                 | 50  | 7  | 5     |  |                                     |   |   |   |  |                     |
| 6  | 6                                   | 171                                       | 17,300                                  | 117                                       | 6  | 6     |  |                                     |   |   |   |  |                     |
| 7  | 6                                   | 251                                       | 15,525                                  | 62  | 3  | 7     |  |                                     |   |   |   |  |                     |
| 8  | 2                                   | 75  | 10,800                                  | 144                                       | 6  | 8     |  |                                     |   |   |   |  |                     |
| <b>TOTAL UNITED STATES</b>                           | <b>59</b>                           | <b>3,413</b>                              | <b>236,619</b>                          | <b>69</b>                                 | <b>7</b>   |       | <b>TOTAL UNITED STATES</b>                             | <b>68</b>                           | <b>1,264</b>                              | <b>143,910</b>                          | <b>114</b>                                | <b>9</b>   | <b>5, 7 &amp; 2</b> |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                     |   |   |   |  |       | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |   |   |  |                     |
| Less than 9,900                                      | 38                                  | 858                                       | 67,858                                  | 79  | 10   |       | Less than 499  | 10                                  | 124                                       | 3,780                                   | 30  | 8  |                     |
| 10 - 49,900  | 72                                  | 14,250                                    | 724,958                                 | 51  | 9  |       | 500 - 999  | 5                                   | 58  | 4,475                                   | 77  | 11   |                     |
| 50 - 99,900  | 17                                  | 5,423                                     | 331,775                                 | 61  | 13   |       | 1,000 - 1,999  | 29                                  | 431                                       | 46,280                                  | 107                                       | 8  |                     |
| 100 - 199,900  | 19                                  | 11,308                                    | 540,155                                 | 48  | 7  |       | 2,000 - 2,999  | 7                                   | 22  | 2,700                                   | 123                                       | 13   |                     |
| 200,000 plus   | 6                                   | 2,279                                     | 143,250                                 | 63  | 11   |       | 3,000 - 4,999  | 4                                   | 16  | 725                                     | 45  | 1  |                     |
|  |                                     |   |   |   |  |       | 5,000 plus   | 13                                  | 613                                       | 85,950                                  | 140                                       | 9  |                     |
| <b>F. SULPHURIC ACID</b>                             |                                     |   |   |   |  |       | <b>F. SULPHURIC ACID</b>                               |                                     |   |   |   |  |                     |
| OCDM REGION NO. 1                                    | 0                                   | -   | -                                       | -   | -  | -     |  |                                     |   |   |   |  |                     |
| 2  | 6                                   | 8,853                                     | 296,579                                 | 34  | 4  | 2     |  |                                     |   |   |   |  |                     |
| 3  | 0                                   | -   | -                                       | -   | -  | -     |  |                                     |   |   |   |  |                     |
| 4  | 5                                   | 2,009                                     | 100,480                                 | 50  | 7  | 4     |  |                                     |   |   |   |  |                     |
| 5  | 24                                  | 79,847                                    | 1,409,670                               | 18  | 4  | 5     |  |                                     |   |   |   |  |                     |
| 6  | 7                                   | 4,765                                     | 163,470                                 | 34  | 4  | 6     |  |                                     |   |   |   |  |                     |
| 7  | 6                                   | 3,417                                     | 48,280                                  | 14  | 3  | 7     |  |                                     |   |   |   |  |                     |
| 8  | 2                                   | 1,928                                     | 68,100                                  | 35  | 6  | 8     |  |                                     |   |   |   |  |                     |
| <b>TOTAL UNITED STATES</b>                           | <b>50</b>                           | <b>100,819</b>                            | <b>2,086,579</b>                        | <b>21</b>                                 | <b>4</b>   |       | <b>TOTAL UNITED STATES</b>                             | <b>220</b>                          | <b>63,475</b>                             | <b>2,933,120</b>                        | <b>46</b>                                 | <b>5</b>   | <b>5</b>            |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                     |   |   |   |  |       | TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |   |   |  |                     |
| Less than 9,900                                      | 38                                  | 858                                       | 67,858                                  | 79  | 10   |       | Less than 499  | 32                                  | 2,414                                     | 199,440                                 | 81  | 5  |                     |
| 10 - 49,900  | 72                                  | 14,250                                    | 724,958                                 | 51  | 9  |       | 500 - 999  | 38                                  | 4,903                                     | 336,080                                 | 69  | 5  |                     |
| 50 - 99,900  | 17                                  | 5,423                                     | 331,775                                 | 61  | 13   |       | 1,000 - 1,999  | 56                                  | 16,643                                    | 603,422                                 | 36  | 6  |                     |
| 100 - 199,900  | 19                                  | 11,308                                    | 540,155                                 | 48  | 7  |       | 2,000 - 2,999  | 31                                  | 12,742                                    | 467,917                                 | 37  | 5  |                     |
| 200,000 plus   | 6                                   | 2,279                                     | 143,250                                 | 63  | 11   |       | 3,000 - 4,999  | 27                                  | 9,367                                     | 436,778                                 | 47  | 5  |                     |
|  |                                     |   |   |   |  |       | 5,000 plus   | 36                                  | 17,406                                    | 889,483                                 | 51  | 6  |                     |

<sup>1/</sup> Calculated



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 11 (cont'd)

CATEGORY: WATER TREATING COMPOUNDS & CHEMICALS (Continued)

REFINERIES

G. FLOCCULATING AGENTS

|                            |           |               |                  |           |          |       |
|----------------------------|-----------|---------------|------------------|-----------|----------|-------|
| OCDM REGION NO. 1          | 5         | 3,230         | 239,700          | 74        | 4        | 2 & 4 |
| 2                          | 16        | 19,788        | 320,985          | 16        | 7        | 2 & 1 |
| 3                          | 0         | -             | -                | -         | -        | -     |
| 4                          | 10        | 1,624         | 131,600          | 81        | 11       | 4 & 2 |
| 5                          | 22        | 43,818        | 2,163,550        | 49        | 8        | 5     |
| 6                          | 12        | 3,370         | 223,900          | 66        | 11       | 6 & 4 |
| 7                          | 11        | 3,955         | 181,700          | 46        | 9        | 7     |
| 8                          | 5         | 3,018         | 113,196          | 38        | 9        | 8 & 7 |
| <u>TOTAL UNITED STATES</u> | <u>81</u> | <u>78,803</u> | <u>3,374,631</u> | <u>43</u> | <u>9</u> |       |

H. SODA ASH

|                            |           |               |                  |           |          |       |
|----------------------------|-----------|---------------|------------------|-----------|----------|-------|
| OCDM REGION NO. 1          | 3         | 87            | 6,900            | 79        | 4        | 1     |
| 2                          | 13        | 5,415         | 346,368          | 64        | 8        | 2     |
| 3                          | 1         | 50            | -                | -         | 14       | 2     |
| 4                          | 12        | 8,819         | 635,470          | 72        | 11       | 4 & 2 |
| 5                          | 21        | 8,175         | 473,300          | 58        | 6        | 5     |
| 6                          | 7         | 8,152         | 368,500          | 45        | 9        | 6 & 5 |
| 7                          | 6         | 2,316         | 145,500          | 63        | 7        | 7     |
| 8                          | 4         | 485           | 41,780           | 86        | 7        | 8 & 6 |
| <u>TOTAL UNITED STATES</u> | <u>67</u> | <u>33,499</u> | <u>2,017,818</u> | <u>60</u> | <u>8</u> |       |

<sup>1/</sup> Calculated

Report of National Petroleum Council's Committee on Petroleum Refinery Maintenance and Chemical Requirements  
(1960) dated February 7, 1961.

NATURAL GASOLINE PLANTS

G. FLOCCULATING AGENTS

NONE

H. SODA ASH

|  |           |              |                |           |          |   |
|--|-----------|--------------|----------------|-----------|----------|---|
| <u>TOTAL UNITED STATES</u>                             | <u>57</u> | <u>8,377</u> | <u>444,382</u> | <u>53</u> | <u>8</u> | 5 |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |           |              |                |           |          |   |
| Less than 499  | 9         | 466          | 36,702         | 79        | 2        |   |
| 500 - 999  | 10        | 3,079        | 75,180         | 24        | 11       |   |
| 1,000 - 1,999  | 12        | 917          | 121,250        | 132       | 7        |   |
| 2,000 - 2,999  | 5         | 425          | 40,500         | 95        | 12       |   |
| 3,000 - 4,999  | 8         | 756          | 34,650         | 46        | 10       |   |
| 5,000 plus   | 13        | 2,734        | 136,100        | 50        | 10       |   |

I. SODIUM HYDROXIDE

|  |           |              |               |           |          |   |
|--|-----------|--------------|---------------|-----------|----------|---|
| <u>TOTAL UNITED STATES</u>                             | <u>60</u> | <u>1,158</u> | <u>37,886</u> | <u>33</u> | <u>6</u> | 5 |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |           |              |               |           |          |   |
| Less than 499  | 12        | 84           | 4,291         | 51        | 6        |   |
| 500 - 999  | 4         | 48           | 1,550         | 32        | 8        |   |
| 1,000 - 1,999  | 13        | 137          | 7,230         | 53        | 5        |   |
| 2,000 - 2,999  | 5         | 55           | 1,850         | 34        | 7        |   |
| 3,000 - 4,999  | 11        | 625          | 9,190         | 15        | 4        |   |
| 5,000 plus   | 15        | 209          | 13,775        | 66        | 7        |   |

J. ALGICIDES

|  |           |            |               |           |          |   |
|--|-----------|------------|---------------|-----------|----------|---|
| <u>TOTAL UNITED STATES</u>                             | <u>59</u> | <u>804</u> | <u>25,500</u> | <u>32</u> | <u>8</u> | 5 |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |           |            |               |           |          |   |
| Less than 499  | 6         | 27         | 970           | 36        | 10       |   |
| 500 - 999  | 14        | 75         | 4,137         | 55        | 7        |   |
| 1,000 - 1,999  | 19        | 111        | 8,843         | 80        | 7        |   |
| 2,000 - 2,999  | 8         | 431        | 4,890         | 11        | 10       |   |
| 3,000 - 4,999  | 6         | 77         | 1,940         | 25        | 6        |   |
| 5,000 plus   | 6         | 83         | 4,720         | 57        | 11       |   |



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: ADDITIVES & INHIBITORS (PRODUCT APPLICATION)

REFINERIES

|  | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS <sup>1</sup><br>SUPPLY <sup>1</sup> /<br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--|--------------------------------------|-------------------------------------|---|--|---|--|
| <b>A. ANTIOXIDANTS</b>                               |                                      |                                     |   |  |   |  |
| OCDM REGION NO. 1                                    | 8                                    | 4,173                               | 805,910                                   | 193  | 12  | 1  |
| 2  | 24                                   | 23,706                              | 786,607                                   | 33   | 11  | 2 & 1  |
| 3  | 2                                    | 17                                  | 3,050                                     | 179  | 8   | 4 & 1  |
| 4  | 19                                   | 8,315                               | 546,366                                   | 66   | 9   | 4  |
| 5  | 44                                   | 21,504                              | 1,342,890                                 | 62   | 9   | 5 & 4  |
| 6  | 27                                   | 1,088                               | 84,825                                    | 78   | 9   | 4 & 6  |
| 7  | 18                                   | 6,845                               | 527,446                                   | 77   | 9   | 7  |
| 8  | 8                                    | 624                                 | 29,087                                    | 47   | 11  | 8 & 7  |
| <b>TOTAL UNITED STATES</b>                           | <b>150</b>                           | <b>66,272</b>                       | <b>4,126,181</b>                          | <b>62</b>  | <b>9</b>                                  |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |  |   |  |
| Less than 9,900                                      | 45                                   | 10,943                              | 307,937                                   | 28   | 9   |  |
| 10 - 49,900  | 65                                   | 6,407                               | 311,005                                   | 48   | 9   |  |
| 50 - 99,900  | 18                                   | 8,823                               | 1,063,550                                 | 120  | 10  |  |
| 100 - 199,900  | 16                                   | 21,139                              | 1,258,369                                 | 60   | 11  |  |
| 200,000 plus   | 6                                    | 18,960                              | 1,185,320                                 | 63   | 16  |  |
| <b>B. METAL DEACTIVATORS</b>                         |                                      |                                     |   |  |   |  |
| OCDM REGION NO. 1                                    | 3                                    | 51                                  | 4,020                                     | 79   | 7   | 1  |
| 2  | 13                                   | 578                                 | 45,932                                    | 79   | 11  | 1 & 3  |
| 3  | 0                                    | -                                   | -   | -  | -   | -  |
| 4  | 15                                   | 700                                 | 55,550                                    | 79   | 10  | 4  |
| 5  | 25                                   | 780                                 | 49,760                                    | 64   | 9   | 5 & 6  |
| 6  | 14                                   | 256                                 | 19,816                                    | 77   | 9   | 4 & 6  |
| 7  | 10                                   | 410                                 | 21,594                                    | 53   | 10  | 7  |
| 8  | 5                                    | 95                                  | 7,795                                     | 82   | 9   | 8  |
| <b>TOTAL UNITED STATES</b>                           | <b>85</b>                            | <b>2,870</b>                        | <b>204,467</b>                            | <b>71</b>  | <b>9</b>                                  |  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                     |   |  |   |  |
| Less than 9,900                                      | 10                                   | 97                                  | 6,753                                     | 70   | 8   |  |
| 10 - 49,900  | 49                                   | 868                                 | 69,090                                    | 79   | 8   |  |
| 50 - 99,900  | 9                                    | 281                                 | 24,650                                    | 88   | 12  |  |
| 100 - 199,900  | 13                                   | 1,055                               | 74,774                                    | 71   | 12  |  |
| 200,000 plus   | 4                                    | 569                                 | 29,200                                    | 51   | 18  |  |
| <b>C. RUST &amp; CORROSION INHIBITORS</b>            |                                      |                                     |   |  |   |  |
| OCDM REGION NO. 1                                    | 2                                    | 544                                 | 7,400                                     | 14   | 10  | 2 & 3  |
| 2  | 19                                   | 6,834                               | 632,709                                   | 93   | 10  | 2 & 6 & 1  |
| 3  | 0                                    | -                                   | -   | -  | -   | -  |
| 4  | 16                                   | 3,295                               | 166,459                                   | 51   | 8   | 4 & 6 & 1  |
| 5  | 34                                   | 53,416                              | 1,760,534                                 | 33   | 9   | 5 & 6  |
| 6  | 15                                   | 5,476                               | 69,503                                    | 13   | 10  | 4 & 5  |
| 7  | 13                                   | 9,314                               | 542,810                                   | 58   | 12  | 7 & 5  |
| 8  | 3                                    | 736                                 | 71,542                                    | 97   | 17  | 5 & 6  |
| <b>TOTAL UNITED STATES</b>                           | <b>102</b>                           | <b>79,615</b>                       | <b>3,250,957</b>                          | <b>41</b>  | <b>10</b>                                 |  |

<sup>1</sup>/ Calculated

TABLE 12 (cont'd)

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: ADDITIVES & INHIBITORS (PRODUCT APPLICATION) (Continued)

REFINERIES

|                                | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--------------------------------|--------------------------------------|-------------------------------------|---|---|---|--|
| <b>D. VI IMPROVERS</b>         |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1              | 1                                    | 10,003                              | 450,300                                   | 45                                      | 4   | 1 & 3  |
| 2                              | 13                                   | 33,382                              | 853,948                                   | 26                                      | 8   | 2 & 1  |
| 3                              | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4                              | 3                                    | 27,400                              | 456,000                                   | 17                                      | 12  | 1 & 2  |
| 5                              | 11                                   | 97,950                              | 4,022,080                                 | 41                                      | 14  | 1 & 5  |
| 6                              | 2                                    | 73,600                              | 280,000                                   | 4                                       | 12  | 5, 6 & 2   |
| 7                              | 5                                    | 6,500                               | 295,500                                   | 45                                      | 18  | 1, 4 & 5   |
| 8                              | 0                                    | -                                   | -   | -                                       | -   | -  |
| <u>TOTAL UNITED STATES</u>     | <u>35</u>                            | <u>248,835</u>                      | <u>6,357,828</u>                          | <u>26</u>                               | <u>12</u>                                 |  |
| <b>E. POUR DEPRESSANTS</b>     |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1              | 4                                    | 8,360                               | 255,760                                   | 31                                      | 12  | 1 & 2  |
| 2                              | 13                                   | 12,377                              | 569,740                                   | 46                                      | 11  | 2, 1 & 6   |
| 3                              | 1                                    | 16                                  | 800                                       | 50                                      | 14  | 1  |
| 4                              | 6                                    | 4,926                               | 194,880                                   | 40                                      | 10  | 3, 5, 4 & 6  |
| 5                              | 12                                   | 14,842                              | 1,385,312                                 | 93                                      | 15  | 1, 2, 5 & 6  |
| 6                              | 5                                    | 7,455                               | 305,200                                   | 41                                      | 13  | 4, 6 & 1   |
| 7                              | 4                                    | 4,430                               | 253,000                                   | 57                                      | 13  | 1, 4 & 2   |
| 8                              | 0                                    | -                                   | -   | -                                       | -   | -  |
| <u>TOTAL UNITED STATES</u>     | <u>45</u>                            | <u>52,406</u>                       | <u>2,964,692</u>                          | <u>57</u>                               | <u>12</u>                                 |  |
| <b>F. MOTOR FUEL ADDITIVES</b> |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1              | 5                                    | 32,836                              | 1,964,797                                 | 60                                      | 15  | 5, 6 & 1   |
| 2                              | 20                                   | 29,081                              | 1,318,761                                 | 44                                      | 11  | 2, 1 & 6   |
| 3                              | 1                                    | 5                                   | 300                                       | 60                                      | 21  | 1  |
| 4                              | 19                                   | 85,811                              | 5,703,670                                 | 66                                      | 14  | 4, 3 & 1   |
| 5                              | 16                                   | 28,715                              | 845,766                                   | 29                                      | 13  | 5, 3 & 2   |
| 6                              | 13                                   | 12,824                              | 686,475                                   | 54                                      | 10  | 4, 5 & 6   |
| 7                              | 9                                    | 36,237                              | 5,403,183                                 | 149                                     | 16  | 7 & 5  |
| 8                              | 4                                    | 830                                 | 65,225                                    | 79                                      | 20  | 7 & 4  |
| <u>TOTAL UNITED STATES</u>     | <u>87</u>                            | <u>226,339</u>                      | <u>15,988,177</u>                         | <u>71</u>                               | <u>13</u>                                 |  |
| <b>G. FUEL OIL ADDITIVES</b>   |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1              | 3                                    | 1,020                               | 142,800                                   | 140                                     | 13  | 5 & 1  |
| 2                              | 9                                    | 1,224                               | 274,578                                   | 224                                     | 11  | 1 & 4  |
| 3                              | 0                                    | -                                   | -   | -                                       | -   | -  |
| 4                              | 17                                   | 2,399                               | 204,702                                   | 85                                      | 13  | 4 & 1  |
| 5                              | 23                                   | 3,634                               | 304,540                                   | 84                                      | 9   | 5 & 6  |
| 6                              | 15                                   | 652                                 | 60,479                                    | 93                                      | 11  | 6 & 4  |
| 7                              | 11                                   | 2,072                               | 185,524                                   | 90                                      | 6   | 7  |
| 8                              | 4                                    | 173                                 | 14,900                                    | 86                                      | 11  | 8 & 1  |
| <u>TOTAL UNITED STATES</u>     | <u>82</u>                            | <u>11,174</u>                       | <u>1,187,523</u>                          | <u>106</u>                              | <u>11</u>                                 |  |
| <b>H. LUBE OIL ADDITIVES</b>   |                                      |                                     |   |   |   |  |
| (Not shown above)              |                                      |                                     |   |   |   |  |
| OCDM REGION NO. 1              | 1                                    | 12,602                              | 270,000                                   | 21                                      | 14  | 2 & 5  |
| 2                              | 63                                   | 56,254                              | 1,615,162                                 | 29                                      | 5   | 2 & 1  |
| 3                              | 2                                    | 642                                 | 86,720                                    | 135                                     | 15  | 2 & 5  |
| 4                              | 3                                    | 76,088                              | 2,046,360                                 | 27                                      | 10  | 4 & 6  |
| 5                              | 11                                   | 62,071                              | 2,661,709                                 | 43                                      | 8   | 5 & 1  |
| 6                              | 4                                    | 16,376                              | 1,072,640                                 | 66                                      | 9   | 1, 5 & 4   |
| 7                              | 4                                    | 38,186                              | 694,817                                   | 18                                      | 16  | 7, 5 & 2   |
| 8                              | 1                                    | 160                                 | 5,280                                     | 33                                      | 10  | 6  |
| <u>TOTAL UNITED STATES</u>     | <u>89</u>                            | <u>262,379</u>                      | <u>8,452,688</u>                          | <u>32</u>                               | <u>7</u>                                  |  |

<sup>1/</sup> Calculated

Report of National Petroleum Council's Committee on Petroleum Refinery Maintenance and Chemical Requirements (1960) dated February 7, 1961.



TABLE 12 (cont'd)

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: ADDITIVES AND INHIBITORS AS THEY APPLY TO PRODUCTS

| N A T U R A L   G A S O L I N E   P L A N T S          |                                     |   |                                      |   |  |   |
|--|-------------------------------------|---|--------------------------------------|---|--|---|
| NUMBER OF<br>NGL PLANTS<br>REPORTING                   | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <u>1</u> /<br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |   |
| I. <u>MERCAPTANS</u>                                   |                                     |   |                                      |   |  |   |
| <u>TOTAL UNITED STATES</u>                             | <u>106</u>                          | <u>3,553</u>                              | <u>144,678</u>                       | <u>41</u>                                 | <u>14</u>  | 5 |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls./D Liquid Recovery) |                                     |   |                                      |   |  |   |
| Less than 499  | 13                                  | 302                                       | 3,389                                | 11  | 19   |   |
| 500 - 999  | 19                                  | 533                                       | 95,942                               | 180                                       | 17   |   |
| 1,000 - 1,999  | 36                                  | 1,757                                     | 12,670                               | 7   | 14   |   |
| 2,000 - 2,999  | 9                                   | 388                                       | 3,838                                | 10  | 12   |   |
| 3,000 - 4,999  | 11                                  | 143                                       | 7,141                                | 50  | 13   |   |
| 5,000 plus   | 18                                  | 430                                       | 21,698                               | 50  | 12   |   |

1/ Calculated

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: QUALITY CONTROL LABORATORY CHEMICALS

R E F I N E R I E S

| NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Gallons) | AVERAGE<br>PLANT<br>INVENTORY<br>(Gallons) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--------------------------------------|--------------------------------------|--|---|---|--|
| 6                                    | 5                                    | 164  | 33                                      | 9   | 1 & 5  |
| 23                                   | 33                                   | 3,072                                      | 93                                      | 21  | 5, 2 & 1   |
| 5                                    | 9                                    | 480  | 53                                      | 17  | 5  |
| 39                                   | 36                                   | 2,727                                      | 76                                      | 15  | 5, 4 & 1   |
| 80                                   | 609                                  | 9,728                                      | 16                                      | 10  | 5, 4 & 1   |
| 27                                   | 30                                   | 1,657                                      | 55                                      | 13  | 5, 4 & 6   |
| 31                                   | 236                                  | 10,432                                     | 44                                      | 17  | 5 & 7  |
| 9                                    | 17                                   | 1,355                                      | 80                                      | 24  | 5 & 1  |
| 220                                  | 975                                  | 29,615                                     | 30                                      | 14  |  |

A. REFERENCE FUELS

B. HELIUM

| OCDM REGION NO.            |           | (Cu. Ft.)  | (Cu. Ft.)     |           |          |       |
|----------------------------|-----------|------------|---------------|-----------|----------|-------|
| 1                          | 0         | -          | -             | -         | -        | -     |
| 2                          | 1         | 60         | 2,720         | 45        | 5        | 2     |
| 3                          | 0         | -          | -             | -         | -        | -     |
| 4                          | 2         | 42         | 408           | 10        | 1        | 4 & 1 |
| 5                          | 7         | 544        | 15,010        | 28        | 3        | 5     |
| 6                          | 3         | 22         | 1,259         | 57        | 15       | 5 & 6 |
| 7                          | 4         | 53         | 1,052         | 20        | 9        | 7     |
| 8                          | 3         | 43         | 1,950         | 45        | 7        | 8 & 5 |
| <u>TOTAL UNITED STATES</u> | <u>20</u> | <u>764</u> | <u>22,399</u> | <u>29</u> | <u>7</u> |       |

<sup>1/</sup> Calculated



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 14

CATEGORY: CORROSION INHIBITORS

REFINERIES

| NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--------------------------------------|-------------------------------------|---|---|---|--|
| OCDM REGION NO. 1                    | 8                                   | 1,604                                     | 80,700                                  | 50  | 3  |
| 2                                    | 23                                  | 3,955                                     | 114,155                                 | 29  | 4  |
| 3                                    | 4                                   | 62  | 15,700                                  | 253                                       | 2  |
| 4                                    | 28                                  | 7,232                                     | 357,090                                 | 49  | 6  |
| 5                                    | 58                                  | 19,149                                    | 898,770                                 | 47  | 4  |
| 6                                    | 18                                  | 2,320                                     | 221,602                                 | 96  | 5  |
| 7                                    | 19                                  | 5,958                                     | 295,905                                 | 50  | 5  |
| 8                                    | 7                                   | 1,049                                     | 53,962                                  | 51  | 9  |
| <u>TOTAL UNITED STATES</u>           | <u>165</u>                          | <u>41,329</u>                             | <u>2,037,884</u>                        | <u>49</u>                                 | <u>5</u>   |

TOTALS BY REFINERY SIZE:  
(Bbls. per calendar day)

|                 |    |        |         |    |   |
|-----------------|----|--------|---------|----|---|
| Less than 9,900 | 50 | 860    | 51,817  | 60 | 3 |
| 10 - 49,900     | 74 | 7,283  | 370,062 | 51 | 5 |
| 50 - 99,900     | 20 | 8,486  | 532,685 | 63 | 8 |
| 100 - 199,900   | 16 | 12,660 | 683,500 | 54 | 6 |
| 200,000 plus    | 5  | 12,040 | 399,820 | 33 | 6 |

NATURAL GASOLINE PLANTS

| NUMBER OF<br>NGL PLANTS<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Pounds) | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--------------------------------------|-------------------------------------|---|---|---|--|
| <u>TOTAL UNITED STATES</u>           | <u>43</u>                           | <u>2,631</u>                              | <u>70,849</u>                           | <u>27</u>                                 | <u>5</u>   |

TOTALS BY NGL PLANT SIZE:  
(Bbls./D Liquid Recovery)

|               |    |       |        |    |    |
|---------------|----|-------|--------|----|----|
| Less than 499 | 5  | 1,769 | 3,270  | 2  | 8  |
| 500 - 999     | 6  | 15    | 1,100  | 73 | 5  |
| 1,000 - 1,999 | 15 | 596   | 52,864 | 89 | 7  |
| 2,000 - 2,999 | 7  | 140   | 10,025 | 72 | 7  |
| 3,000 - 4,999 | 6  | 40    | 1,910  | 48 | 12 |
| 5,000 plus    | 4  | 71    | 1,680  | 24 | 5  |

<sup>1/</sup> Calculated

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: DESICCANTS AND FILTER MEDIA

## REFINERIES

| NUMBER OF<br>REFINERIES<br><u>REPORTING</u> | NORMAL<br>USE<br><u>PER/SD</u><br>(Pounds) | AVERAGE<br>PLANT<br><u>INVENTORY</u><br>(Pounds) | DAYS'<br><u>SUPPLY</u> <sup>1/</sup> | EST. NORMAL<br>DELIVERY<br><u>TIME</u> | MAJOR<br>SOURCE (S)<br><u>OF SUPPLY</u> |
|---|--|--|--------------------------------------|--|---|
| 2   | 7,000                                      | 1,100,000  | 157                                  | 14                                     | 5 & 1                                   |
| 11  | 109,440                                    | 3,255,200  | 30                                   | 15                                     | 5 & 2                                   |
| 0   | -  | -  | -                                    | -                                      | -                                       |
| 8   | 5,288                                      | 120,700  | 23                                   | 20                                     | 5 & 6                                   |
| 19  | 20,236                                     | 6,640,500  | 328                                  | 9                                      | 5 & 6 & 4                               |
| 6   | 34,688                                     | 395,200  | 11                                   | 13                                     | 5 & 6                                   |
| 4   | 1,512                                      | 295,900  | 196                                  | 25                                     | 5 & 7                                   |
| 0   | -  | -  | -                                    | -                                      | -                                       |
| <u>50</u>                                   | <u>178,164</u>                             | <u>11,807,500</u>                                | <u>66</u>                            | <u>13</u>                              |   |

## TOTALS BY REFINERY SIZE:

(Bbls. per calendar day)

|                 |    |         |           |     |    |  |
|-----------------|----|---------|-----------|-----|----|--|
| Less than 9,900 | 12 | 117,210 | 3,373,200 | 29  | 10 |  |
| 10 - 49,900     | 21 | 42,733  | 2,746,000 | 64  | 13 |  |
| 50 - 99,900     | 8  | 7,025   | 1,031,400 | 147 | 9  |  |
| 100 - 199,900   | 7  | 2,196   | 401,900   | 183 | 23 |  |
| 200,000 plus    | 2  | 9,000   | 4,255,000 | 473 | 18 |  |

## B. CLAY

|                            |           |                |                   |           |           |           |
|----------------------------|-----------|----------------|-------------------|-----------|-----------|-----------|
| OCDM REGION NO. 1          | 5         | 8,945          | 433,000           | 48        | 11        | 3 & 1     |
| 2                          | 6         | 3,877          | 284,793           | 73        | 14        | 3 & 5 & 2 |
| 3                          | 1         | 50             | 2,000             | 40        | 17        | 3         |
| 4                          | 12        | 74,434         | 4,732,700         | 64        | 14        | 3 & 4 & 5 |
| 5                          | 20        | 365,549        | 7,774,900         | 21        | 10        | 5 & 3     |
| 6                          | 7         | 60,458         | 112,225           | 2         | 15        | 3 & 6     |
| 7                          | 8         | 28,019         | 1,127,900         | 40        | 10        | 7 & 3     |
| 8                          | 0         | -              | -                 | -         | -         | -         |
| <b>TOTAL UNITED STATES</b> | <b>59</b> | <b>541,332</b> | <b>14,467,518</b> | <b>27</b> | <b>12</b> |           |

## TOTALS BY REFINERY SIZE:

(Bbls. per calendar day)

|                 |    |         |           |    |    |  |
|-----------------|----|---------|-----------|----|----|--|
| Less than 9,900 | 16 | 15,344  | 428,825   | 28 | 10 |  |
| 10 - 49,900     | 20 | 151,102 | 1,627,593 | 11 | 11 |  |
| 50 - 99,900     | 9  | 94,909  | 1,938,800 | 20 | 10 |  |
| 100 - 199,900   | 10 | 50,977  | 2,818,300 | 55 | 17 |  |
| 200,000 plus    | 4  | 229,000 | 7,654,000 | 33 | 16 |  |

## C. CALCIUM CHLORIDE

|                            |           |               |                |           |          |       |
|----------------------------|-----------|---------------|----------------|-----------|----------|-------|
| OCDM REGION NO. 1          | 2         | 956           | 40,000         | 42        | 4        | 1     |
| 2                          | 2         | 192           | 14,000         | 73        | 12       | 4 & 2 |
| 3                          | 0         | -             | -              | -         | -        | -     |
| 4                          | 4         | 1,015         | 61,200         | 60        | 6        | 4     |
| 5                          | 6         | 2,140         | 142,853        | 67        | 8        | 5 & 4 |
| 6                          | 2         | 62            | 7,000          | 113       | 4        | 6     |
| 7                          | 4         | 7,352         | 273,000        | 37        | 15       | 4 & 7 |
| 8                          | 0         | -             | -              | -         | -        | -     |
| <b>TOTAL UNITED STATES</b> | <b>20</b> | <b>11,717</b> | <b>538,053</b> | <b>46</b> | <b>9</b> |       |

<sup>1/</sup> Calculated

## NATURAL GASOLINE PLANTS

| NUMBER OF<br>PLANTS<br><u>REPORTING</u> | NORMAL<br>USE<br><u>PER/SD</u><br>(Pounds) | AVERAGE<br>PLANT<br><u>INVENTORY</u><br>(Pounds) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br><u>TIME</u><br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|---|--|--|---|--|--|
| <u>91</u>                               | <u>333,856</u>                             | <u>1,532,893</u>                                 | <u>5</u>                                | <u>21</u>  | 5 & 2  |

## A. ACTIVATED ALUMINA AND BAUXITE

## TOTALS BY NGL PLANT SIZE:

(Bbls/D Liquid Recovery)

|               |    |         |         |     |    |  |
|---------------|----|---------|---------|-----|----|--|
| Less than 499 | 7  | 22      | 15,500  | 705 | 25 |  |
| 500 - 999     | 14 | 270,166 | 150,560 | 1   | 29 |  |
| 1,000 - 1,999 | 24 | 37,149  | 300,050 | 8   | 22 |  |
| 2,000 - 2,999 | 11 | 19,819  | 23,993  | 1   | 23 |  |
| 3,000 - 4,999 | 11 | 135     | 124,850 | 925 | 14 |  |
| 5,000 plus    | 24 | 6,565   | 917,940 | 140 | 17 |  |

## B. CLAY

## TOTALS BY NGL PLANT SIZE:

(Bbls/D Liquid Recovery)

|               |   |    |        |     |    |  |
|---------------|---|----|--------|-----|----|--|
| Less than 499 | 2 | 20 | 700    | 35  | 13 |  |
| 500 - 999     | 1 | 41 | 10,000 | 244 | 10 |  |
| 1,000 - 1,999 | 2 | 45 | 1,550  | 34  | 22 |  |
| 2,000 - 2,999 | 2 | 45 | 850    | 19  | 12 |  |
| 3,000 - 4,999 | 1 | 15 | 500    | 33  | 2  |  |
| 5,000 plus    | 3 | 41 | 2,700  | 66  | 7  |  |



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: OUTSIDE FEED AND BLENDING STOCKS

REFINERIES

|  | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Barrels) | AVERAGE<br>PLANT<br>INVENTORY<br>(Barrels) | DAYS'<br>SUPPLY <sup>1/</sup> | EST. NORMAL<br>DELIVERY<br>TIME | MAJOR<br>SOURCE (S)<br>OF SUPPLY |
|--|--------------------------------------|--------------------------------------|--|-------------------------------|---------------------------------|----------------------------------|
| <b>A. <u>NATURAL GASOLINE</u></b>                    |                                      |                                      |  |                               |                                 |                                  |
| OCDM REGION NO. 1                                    | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 2  | 2                                    | 83                                   | 486  | 6                             | 3                               | 2                                |
| 3  | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 4  | 1                                    | 71                                   | 286  | 4                             | 1                               | 4                                |
| 5  | 35                                   | 42,540                               | 180,709                                    | 4                             | 2                               | 5                                |
| 6  | 13                                   | 5,674                                | 91,959                                     | 16                            | 3                               | 6                                |
| 7  | 8                                    | 9,515                                | 100,318                                    | 11                            | 3                               | 7                                |
| 8  |                                      |                                      |  |                               |                                 |                                  |
| <u>TOTAL UNITED STATES</u>                           | <u>59</u>                            | <u>57,883</u>                        | <u>373,758</u>                             | <u>6</u>                      | <u>2</u>                        |                                  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                      |  |                               |                                 |                                  |
| Less than 9,900                                      | 28                                   | 9,951                                | 25,106                                     | 3                             | 2                               |                                  |
| 10 - 49,900  | 22                                   | 30,930                               | 199,700                                    | 6                             | 2                               |                                  |
| 50 - 99,900  | 2                                    | 4,700                                | 35,000                                     | 7                             | 3                               |                                  |
| 100 - 199,900  | 7                                    | 12,302                               | 113,952                                    | 9                             | 4                               |                                  |
| 200,000 plus   | 0                                    | -                                    | -  | -                             | -                               |                                  |
| <b>B. <u>ISO - BUTANE</u></b>                        |                                      |                                      |  |                               |                                 |                                  |
| OCDM REGION NO. 1                                    | 2                                    | 400                                  | 0  | 0                             | 2                               | 2 & 5                            |
| 2  | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 3  | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 4  | 4                                    | 9,003                                | 13,178                                     | 1                             | 3                               | 4                                |
| 5  | 14                                   | 14,303                               | 107,273                                    | 8                             | 2                               | 5                                |
| 6  | 10                                   | 6,770                                | 52,000                                     | 8                             | 4                               | 6                                |
| 7  | 4                                    | 1,790                                | 23,000                                     | 13                            | 2                               | 7                                |
| 8  | 1                                    | 1,000                                | 4,000                                      | 4                             | 1                               | 8                                |
| <u>TOTAL UNITED STATES</u>                           | <u>35</u>                            | <u>33,266</u>                        | <u>199,451</u>                             | <u>6</u>                      | <u>3</u>                        |                                  |
| TOTALS BY REFINERY SIZE:<br>(Bbls. per calendar day) |                                      |                                      |  |                               |                                 |                                  |
| Less than 9,900                                      | 4                                    | 1,659                                | 7,459                                      | 4                             | 1                               |                                  |
| 10 - 49,900  | 18                                   | 17,367                               | 82,992                                     | 5                             | 3                               |                                  |
| 50 - 99,900  | 9                                    | 7,590                                | 58,000                                     | 8                             | 3                               |                                  |
| 100 - 199,900  | 4                                    | 6,650                                | 51,000                                     | 8                             | 4                               |                                  |
| 200,000 plus   | 0                                    | -                                    | -  | -                             | -                               |                                  |
| <b>C. <u>ALKYLATE FEED STOCK</u></b>                 |                                      |                                      |  |                               |                                 |                                  |
| OCDM REGION NO. 1                                    | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 2  | 4                                    | 5,276                                | 37,381                                     | 7                             | 9                               | 2                                |
| 3  | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 4  | 5                                    | 1,703                                | 32,911                                     | 19                            | 6                               | 4                                |
| 5  | 8                                    | 5,035                                | 54,633                                     | 11                            | 9                               | 5                                |
| 6  | 3                                    | 826                                  | 4,000                                      | 5                             | 4                               | 6                                |
| 7  | 3                                    | 965                                  | 31,015                                     | 32                            | 1                               | 7                                |
| 8  | 0                                    | -                                    | -  | -                             | -                               | -                                |
| <u>TOTAL UNITED STATES</u>                           | <u>23</u>                            | <u>13,805</u>                        | <u>159,940</u>                             | <u>12</u>                     | <u>7</u>                        |                                  |
| <b>D. <u>TOLUENE</u></b>                             |                                      |                                      |  |                               |                                 |                                  |
|  |                                      | (GALLONS)                            | (GALLONS)                                  |                               |                                 |                                  |
| OCDM REGION NO. 1                                    | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 2  | 1                                    | 2                                    | 3  | 2                             | 4                               | 2                                |
| 3  | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 4  | 3                                    | 1                                    | 85   | 85                            | 19                              | 5                                |
| 5  | 17                                   | 18,660                               | 429,322                                    | 23                            | 8                               | 5                                |
| 6  | 4                                    | 2,670                                | 70,490                                     | 26                            | 8                               | 4 & 7                            |
| 7  | 4                                    | 7,566                                | 294,100                                    | 39                            | 8                               | 7                                |
| 8  | 2                                    | 2                                    | 300  | 150                           | 28                              | 5                                |
| <u>TOTAL UNITED STATES</u>                           | <u>31</u>                            | <u>28,901</u>                        | <u>794,300</u>                             | <u>27</u>                     | <u>11</u>                       |                                  |

<sup>1/</sup> Calculated

TABLE 16 (cont'd)

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: OUTSIDE FEED AND BLENDING STOCKS (Continued)

R E F I N E R I E S

|                            | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Barrels) | AVERAGE<br>PLANT<br>INVENTORY<br>(Barrels) | DAYS'<br>SUPPLY <sup>1/</sup> | EST. NORMAL<br>DELIVERY<br>TIME | MAJOR<br>SOURCE (S)<br>OF SUPPLY |
|----------------------------|--------------------------------------|--------------------------------------|--|-------------------------------|---------------------------------|----------------------------------|
| E. <u>BUTANE</u>           |                                      |                                      |  |                               |                                 |                                  |
| OCDM REGION NO. 1          | 1                                    | 3,000                                | 50,000                                     | 17                            | 10                              | 5                                |
| 2                          | 1                                    | 1,200                                | 50,000                                     | 42                            | 10                              | 2                                |
| 3                          | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 4                          | 3                                    | 1,983                                | 18,800                                     | 9                             | 12                              | 6, 4 & 5                         |
| 5                          | 12                                   | 17,480                               | 618,750                                    | 35                            | 7                               | 5                                |
| 6                          | 0                                    | -                                    | -  | -                             | -                               | -                                |
| 7                          | 4                                    | 2,615                                | 48,000                                     | 18                            | 1                               | 7                                |
| 8                          | <u>1</u>                             | <u>880</u>                           | <u>8,000</u>                               | <u>9</u>                      | <u>4</u>                        | <u>8</u>                         |
| <u>TOTAL UNITED STATES</u> | <u>22</u>                            | <u>27,158</u>                        | <u>793,550</u>                             | <u>29</u>                     | <u>7</u>                        |                                  |

<sup>1/</sup> Calculated



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: OUTSIDE FEED AND BLENDING STOCKS

N A T U R A L   G A S O L I N E   P L A N T S

| NUMBER OF<br>NGL PLANTS<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Gallons) | AVERAGE<br>PLANT<br>INVENTORY<br>(Gallons) | DAYS'<br>SUPPLY <u>1/</u><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|--------------------------------------|--------------------------------------|--|-------------------------------------|---|--|
|--------------------------------------|--------------------------------------|--|-------------------------------------|---|--|

F. KEROSINE

|                     |    |        |         |    |   |   |
|---------------------|----|--------|---------|----|---|---|
| TOTAL UNITED STATES | 38 | 14,380 | 498,400 | 35 | 2 | 5 |
|---------------------|----|--------|---------|----|---|---|

TOTALS BY NGL PLANT SIZE:  
(Bbbls./D Liquid Recovery)

|               |    |       |         |     |   |  |
|---------------|----|-------|---------|-----|---|--|
| Less than 499 | 4  | 370   | 4,400   | 12  | 3 |  |
| 500 - 999     | 5  | 715   | 213,400 | 298 | 4 |  |
| 1,000 - 1,999 | 4  | 703   | 19,000  | 27  | 2 |  |
| 2,000 - 2,999 | 10 | 2,464 | 85,400  | 35  | 1 |  |
| 3,000 - 4,999 | 8  | 4,035 | 98,000  | 24  | 2 |  |
| 5,000 plus    | 7  | 6,093 | 78,200  | 13  | 1 |  |

1/ Calculated

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: CONTAINERS

## REFINERIES

|   | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Units) | AVERAGE<br>PLANT<br>INVENTORY<br>(Units) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |         |
|---|--------------------------------------|------------------------------------|--|---|---|--|---------|
| A. 55 GALLON DRUMS                                  |                                      |                                    |  |   |   |  |         |
| OCDM REGION NO.                                     | 1                                    | 2                                  | 1,600                                    | 40,000                                  | 25  | 3  | 1 & 2   |
|   | 2                                    | 9                                  | 5,097                                    | 29,055                                  | 6   | 5  | 2       |
|   | 3                                    | 3                                  | 15                                       | 465                                     | 31  | 3  | 3       |
|   | 4                                    | 1                                  | 20                                       | 400                                     | 20  | 4  | 5       |
|   | 5                                    | 10                                 | 1,251                                    | 26,907                                  | 22  | 10   | 5       |
|   | 6                                    | 2                                  | 460                                      | 3,200                                   | 7   | 10   | 6       |
|   | 7                                    | 2                                  | 670                                      | 6,300                                   | 9   | 7  | 7       |
|   | 8                                    | 1                                  | 4  | 100                                     | 25  | 8  | 8       |
| <u>TOTAL UNITED STATES</u>                          | <u>30</u>                            | <u>9,117</u>                       | <u>106,427</u>                           | <u>12</u>                               | <u>6</u>                                  |  |         |
| B. 5 GALLON CANS                                    |                                      |                                    |  |   |   |  |         |
| OCDM REGION NO.                                     | 1                                    | 1                                  | 2  | 50                                      | 25  | 14   | 1 & 2   |
|   | 2                                    | 5                                  | 8,200                                    | 30,030                                  | 4   | 12   | 1 & 2   |
|   | 3                                    | 1                                  | 1  | 100                                     | 100                                       | 5  | 3       |
|   | 4                                    | 0                                  | -  | -                                       | -   | -  | -       |
|   | 5                                    | 8                                  | 1,665                                    | 46,084                                  | 28  | 13   | 6 & 5   |
|   | 6                                    | 2                                  | 760                                      | 9,000                                   | 12  | 12   | 6       |
|   | 7                                    | 1                                  | 4  | 150                                     | 38  | 10   | 7       |
|   | 8                                    | 0                                  | -  | -                                       | -   | -  | -       |
| <u>TOTAL UNITED STATES</u>                          | <u>18</u>                            | <u>10,632</u>                      | <u>85,414</u>                            | <u>8</u>                                | <u>12</u>                                 |  |         |
| C. 1 QUART CANS                                     |                                      |                                    |  |   |   |  |         |
| OCDM REGION NO.                                     | 1                                    | 2                                  | 60,769                                   | 1,824,400                               | 30  | 12   | 1 & 2   |
|   | 2                                    | 6                                  | 480,800                                  | 1,259,600                               | 3   | 6  | 1 & 2   |
|   | 3                                    | 1                                  | 2,800                                    | 96,000                                  | 34  | 21   | 3       |
|   | 4                                    | 2                                  | 7,402                                    | 250,400                                 | 34  | 16   | 4       |
|   | 5                                    | 5                                  | 469,296                                  | 5,342,960                               | 11  | 12   | 5 & 6   |
|   | 6                                    | 2                                  | 200,700                                  | 245,000                                 | 1   | 8  | 6       |
|   | 7                                    | 1                                  | 2,400                                    | 250,000                                 | 104                                       | 3  | 7       |
|   | 8                                    | 0                                  | -  | -                                       | -   | -  | -       |
| <u>TOTAL UNITED STATES</u>                          | <u>19</u>                            | <u>1,224,167</u>                   | <u>9,268,360</u>                         | <u>8</u>                                | <u>10</u>                                 |  |         |
| D. CARTONS (Boxes)                                  |                                      |                                    |  |   |   |  |         |
| OCDM REGION NO.                                     | 1                                    | 5                                  | 17,265                                   | 1,257,449                               | 73  | 14   | 1 & 2   |
|   | 2                                    | 9                                  | 16,939                                   | 268,000                                 | 16  | 15   | 2       |
|   | 3                                    | 2                                  | 1,465                                    | 34,000                                  | 23  | 18   | 6 & 3   |
|   | 4                                    | 5                                  | 8,982                                    | 77,400                                  | 9   | 19   | 4       |
|   | 5                                    | 18                                 | 17,701                                   | 621,057                                 | 35  | 11   | 5       |
|   | 6                                    | 6                                  | 3,701                                    | 90,200                                  | 24  | 13   | 2 & 6   |
|   | 7                                    | 10                                 | 22,170                                   | 1,281,000                               | 58  | 22   | 7       |
|   | 8                                    | 3                                  | 1,680                                    | 50,000                                  | 30  | 8  | 8       |
| <u>TOTAL UNITED STATES</u>                          | <u>58</u>                            | <u>89,903</u>                      | <u>3,679,106</u>                         | <u>41</u>                               | <u>15</u>                                 |  |         |
| E. OTHER METAL CONTAINERS<br>(Steel, Tin, Aluminum) |                                      |                                    |  |   |   |  |         |
| OCDM REGION NO.                                     | 1                                    | 4                                  | 146,105                                  | 302,190                                 | 2   | 10   | 1 & 2   |
|   | 2                                    | 10                                 | 3,639                                    | 66,150                                  | 18  | 6  | 2       |
|   | 3                                    | 2                                  | 930                                      | 12,000                                  | 13  | 11   | 3 & 4   |
|   | 4                                    | 12                                 | 146,892                                  | 1,595,481                               | 11  | 11   | 4,5 & 2 |
|   | 5                                    | 13                                 | 5,893                                    | 56,953                                  | 10  | 7  | 5       |
|   | 6                                    | 9                                  | 325,567                                  | 1,335,300                               | 4   | 15   | 6       |
|   | 7                                    | 12                                 | 119,550                                  | 5,111,425                               | 43  | 10   | 7       |
|   | 8                                    | 1                                  | 6  | 200                                     | 33  | 4  | 8       |
| <u>TOTAL UNITED STATES</u>                          | <u>63</u>                            | <u>748,582</u>                     | <u>8,479,699</u>                         | <u>11</u>                               | <u>10</u>                                 |  |         |

<sup>1/</sup> Calculated



PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 18

CATEGORY: MISCELLANEOUS COMPOUNDS AND CHEMICALS

REFINERIES

|                            | NUMBER OF<br>REFINERIES<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Cu. Ft.) | AVERAGE<br>PLANT<br>INVENTORY<br>(Cu. Ft.) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|----------------------------|--------------------------------------|--------------------------------------|--|---|---|--|
| A. <u>NITROGEN</u>         |                                      |                                      |  |   |   |  |
| OCDM REGION NO. 1          | 3                                    | 7,350                                | 50,000                                     | 7                                       | 2   | 1 & 2  |
| 2                          | 5                                    | 42,125                               | 649,024                                    | 15                                      | 5   | 4 & 1  |
| 3                          | 0                                    | -                                    | -  | -                                       | -   | -  |
| 4                          | 6                                    | 23,198                               | 213,515                                    | 9                                       | 2   | 4  |
| 5                          | 19                                   | 126,594                              | 449,064                                    | 4                                       | 3   | 5  |
| 6                          | 7                                    | 21,350                               | 61,575                                     | 3                                       | 6   | 6  |
| 7                          | 6                                    | 2,573                                | 163,652                                    | 64                                      | 2   | 7  |
| 8                          | 6                                    | 2,524                                | 120,360                                    | 48                                      | 10  | 8 & 4  |
| <u>TOTAL UNITED STATES</u> | <u>52</u>                            | <u>225,714</u>                       | <u>1,707,190</u>                           | <u>8</u>                                | <u>4</u>                                  |  |
| B. <u>EMULSION BREAKER</u> |                                      |                                      |  |   |   |  |
|                            |                                      | (Gallons)                            | (Gallons)                                  |   |   |  |
| OCDM REGION NO. 1          | 2                                    | 23                                   | 1,107                                      | 48                                      | 12  | 4 & 6  |
| 2                          | 14                                   | 169                                  | 11,995                                     | 71                                      | 14  | 6 & 5  |
| 3                          | 2                                    | 4                                    | 188  | 47                                      | 10  | 6  |
| 4                          | 11                                   | 336                                  | 18,780                                     | 56                                      | 8   | 6 & 4  |
| 5                          | 13                                   | 264                                  | 9,905                                      | 38                                      | 8   | 6 & 5  |
| 6                          | 10                                   | 113                                  | 12,988                                     | 115                                     | 9   | 6 & 5 & 7  |
| 7                          | 5                                    | 10                                   | 457  | 46                                      | 3   | 7  |
| 8                          | 2                                    | 191                                  | 8,571                                      | 45                                      | 9   | 8  |
| <u>TOTAL UNITED STATES</u> | <u>59</u>                            | <u>1,110</u>                         | <u>63,991</u>                              | <u>58</u>                               | <u>10</u>                                 |  |
| C. <u>ETHYLENE GLYCOLS</u> |                                      |                                      |  |   |   |  |
|                            |                                      | (Gallons)                            | (Gallons)                                  |   |   |  |
| OCDM REGION NO. 1          | 0                                    | -                                    | -  | -                                       | -   | -  |
| 2                          | 4                                    | 550                                  | 31,699                                     | 58                                      | 6   | 1 & 2 & 6  |
| 3                          | 0                                    | -                                    | -  | -                                       | -   | -  |
| 4                          | 4                                    | 53                                   | 2,391                                      | 45                                      | 17  | 6 & 2  |
| 5                          | 9                                    | 765                                  | 233,892                                    | 306                                     | 5   | 4 & 5 & 7  |
| 6                          | 2                                    | 3                                    | 453  | 151                                     | 3   | 6  |
| 7                          | 7                                    | 59                                   | 38,622                                     | 655                                     | 6   | 5 & 7  |
| 8                          | 0                                    | -                                    | -  | -                                       | -   | -  |
| <u>TOTAL UNITED STATES</u> | <u>26</u>                            | <u>1,430</u>                         | <u>307,057</u>                             | <u>215</u>                              | <u>7</u>                                  |  |

<sup>1/</sup> Calculated

PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

CATEGORY: MISCELLANEOUS COMPOUNDS AND CHEMICALS

NATURAL GASOLINE PLANTS

|   | NUMBER OF<br>PLANTS<br>REPORTING | NORMAL<br>USE<br>PER/SD<br>(Gallons) | AVERAGE<br>PLANT<br>INVENTORY<br>(Gallons) | DAYS'<br>SUPPLY <sup>1/</sup><br>(Days) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
|---|----------------------------------|--------------------------------------|--|---|---|--|
| D. <u>ABSORPTION OIL</u>                              |                                  |                                      |  |   |   |  |
| <u>TOTAL UNITED STATES</u>                            | <u>84</u>                        | <u>22,621</u>                        | <u>767,725</u>                             | <u>34</u>                               | <u>7</u>                                  | 5  |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls/D Liquid Recovery) |                                  |                                      |  |   |   |  |
| Less than 499   | 20                               | 3,987                                | 62,065                                     | 16                                      | 10  |  |
| 500 - 999   | 18                               | 2,448                                | 170,550                                    | 70                                      | 7   |  |
| 1,000 - 1,999   | 23                               | 4,538                                | 184,845                                    | 41                                      | 5   |  |
| 2,000 - 2,999   | 4                                | 1,013                                | 31,800                                     | 31                                      | 2   |  |
| 3,000 - 4,999   | 11                               | 3,745                                | 164,165                                    | 44                                      | 5   |  |
| 5,000 plus  | 8                                | 6,890                                | 154,300                                    | 22                                      | 6   |  |
| E. <u>LUBE OIL</u>                                    |                                  |                                      |  |   |   |  |
| <u>TOTAL UNITED STATES</u>                            | <u>30</u>                        | <u>3,576</u>                         | <u>211,170</u>                             | <u>59</u>                               | <u>8</u>                                  | 5  |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls/D Liquid Recovery) |                                  |                                      |  |   |   |  |
| Less than 499   | 3                                | 65                                   | 7,860                                      | 121                                     | 3   |  |
| 500 - 999   | 7                                | 362                                  | 25,920                                     | 72                                      | 9   |  |
| 1,000 - 1,999   | 9                                | 401                                  | 56,660                                     | 141                                     | 4   |  |
| 2,000 - 2,999   | 5                                | 453                                  | 19,330                                     | 43                                      | 14  |  |
| 3,000 - 4,999   | 2                                | 345                                  | 16,500                                     | 48                                      | 4   |  |
| 5,000 plus  | 4                                | 1,950                                | 84,900                                     | 44                                      | 14  |  |
| F. <u>METHANOL</u>                                    |                                  |                                      |  |   |   |  |
| <u>TOTAL UNITED STATES</u>                            | <u>51</u>                        | <u>2,067</u>                         | <u>34,762</u>                              | <u>17</u>                               | <u>7</u>                                  | 5  |
| TOTALS BY NGL PLANT SIZE:<br>(Bbls/D Liquid Recovery) |                                  |                                      |  |   |   |  |
| Less than 499   | 6                                | 73                                   | 603  | 8                                       | 6   |  |
| 500 - 999   | 5                                | 47                                   | 6,492                                      | 138                                     | 9   |  |
| 1,000 - 1,999   | 14                               | 1,424                                | 10,135                                     | 7                                       | 9   |  |
| 2,000 - 2,999   | 13                               | 221                                  | 5,525                                      | 25                                      | 4   |  |
| 3,000 - 4,999   | 6                                | 259                                  | 7,457                                      | 29                                      | 4   |  |
| 5,000 plus  | 7                                | 43                                   | 4,550                                      | 106                                     | 8   |  |

<sup>1/</sup> Calculated

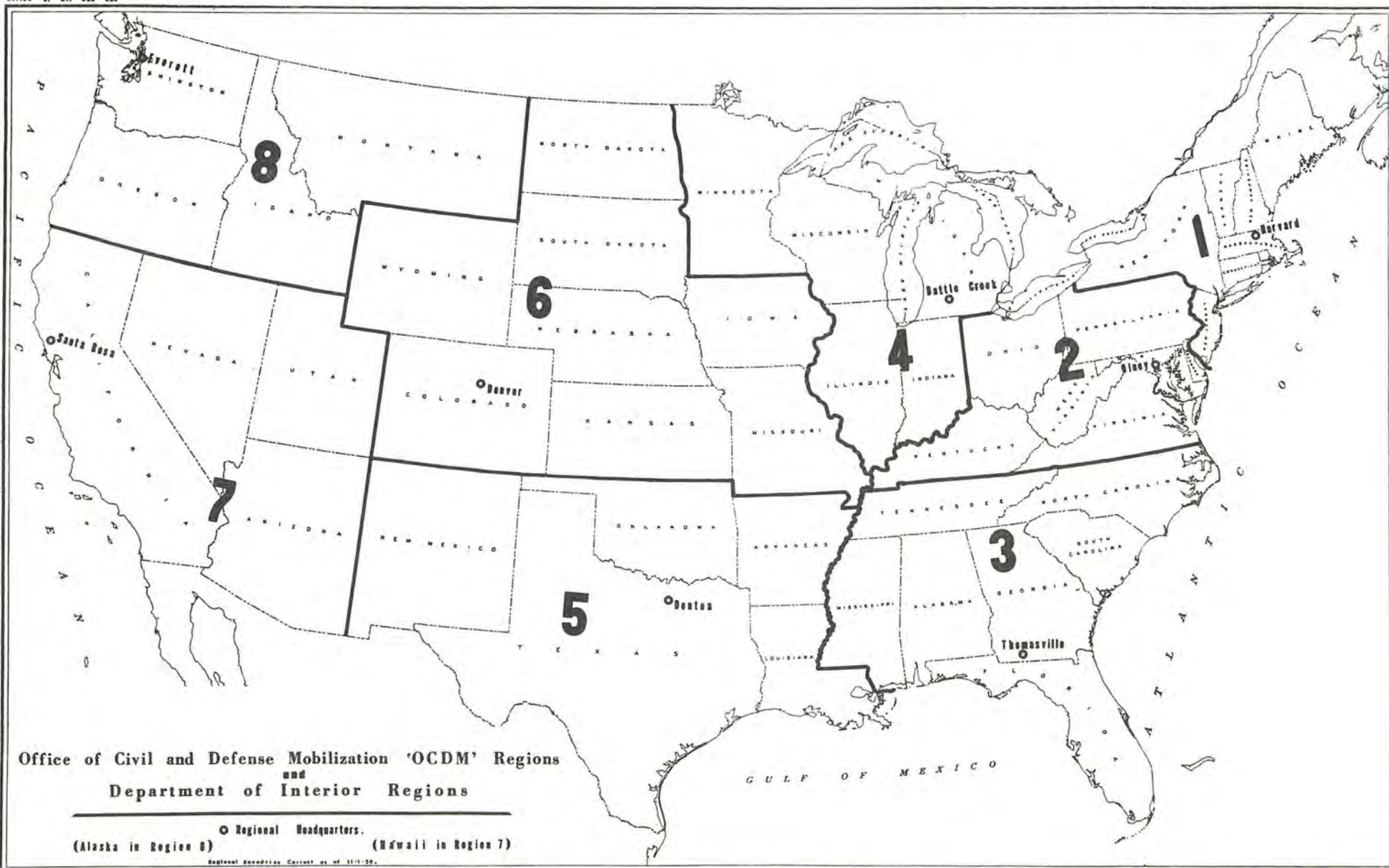


PROCESS CHEMICALS REQUIRED BY U.S. REFINERIES AND NATURAL GASOLINE PLANTS  
TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS

TABLE 19

CATEGORY: FIRE FIGHTING CHEMICALS

| REFINERIES                   |                                      |  |   |  | NATURAL GASOLINE PLANTS                               |                                  |   |   |  |
|------------------------------|--------------------------------------|--|---|--|---|----------------------------------|---|---|--|
|                              | NUMBER OF<br>REFINERIES<br>REPORTING | AVERAGE<br>PLANT<br>INVENTORY<br>(Gallons) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |   | NUMBER OF<br>PLANTS<br>REPORTING | AVERAGE<br>PLANT<br>INVENTORY<br>(Pounds) | EST. NORMAL<br>DELIVERY<br>TIME<br>(Days) | MAJOR<br>SOURCE (S)<br>OF SUPPLY<br>(OCDM Regions) |
| <u>A. FOAM (Liquid Form)</u> |                                      |  |   |  |   |                                  |   |   |  |
| OCDM REGION NO. 1            | 7                                    | 14,785                                     | 3   | 1  |   |                                  |   |   |  |
| 2                            | 10                                   | 5,446,900                                  | 7   | 2  |   |                                  |   |   |  |
| 3                            | 1                                    | 5,000                                      | 90  | Foreign  |   |                                  |   |   |  |
| 4                            | 10                                   | 19,875                                     | 7   | 2 & 1  |   |                                  |   |   |  |
| 5                            | 24                                   | 41,265                                     | 6   | 5  |   |                                  |   |   |  |
| 6                            | 9                                    | 19,900                                     | 8   | 6 & 2  |   |                                  |   |   |  |
| 7                            | 8                                    | 20,810                                     | 11  | 7  |   |                                  |   |   |  |
| 8                            | 3                                    | 21,500                                     | 19  | 2  |   |                                  |   |   |  |
| <u>TOTAL UNITED STATES</u>   | <u>72</u>                            | <u>5,590,035</u>                           | <u>9</u>                                  |  |   |                                  |   |   |  |
| <u>B. FOAM (Powder Form)</u> |                                      |  |   |  | <u>B. FOAM (Powder Form)</u>                          |                                  |   |   |  |
|                              |                                      | (Pounds)                                   |   |  |   |                                  |   |   |  |
| OCDM REGION NO. 1            | 7                                    | 473,700                                    | 8   | 1  |   |                                  |   |   |  |
| 2                            | 22                                   | 735,636                                    | 4   | 2 & 1  |   |                                  |   |   |  |
| 3                            | 2                                    | 45,820                                     | 17  | 2  |   |                                  |   |   |  |
| 4                            | 22                                   | 949,900                                    | 6   | 4 & 2  |   |                                  |   |   |  |
| 5                            | 40                                   | 2,494,225                                  | 7   | 5  |   |                                  |   |   |  |
| 6                            | 14                                   | 283,392                                    | 8   | 6  |   |                                  |   |   |  |
| 7                            | 13                                   | 1,452,300                                  | 10  | 7 & 2  |   |                                  |   |   |  |
| 8                            | 5                                    | 157,750                                    | 13  | 2 & 7  |   |                                  |   |   |  |
| <u>TOTAL UNITED STATES</u>   | <u>125</u>                           | <u>6,592,723</u>                           | <u>7</u>                                  |  | <u>TOTAL UNITED STATES</u>                            | <u>76</u>                        | <u>85,062</u>                             | <u>8</u>                                  | <u>5</u>   |
|                              |                                      |  |   |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls/D Liquid Recovery) |                                  |   |   |  |
|                              |                                      |  |   |  | Less than 499   | 13                               | 12,720                                    | 7   |  |
|                              |                                      |  |   |  | 500 - 999   | 12                               | 5,672                                     | 11  |  |
|                              |                                      |  |   |  | 1,000 - 1,999   | 18                               | 9,888                                     | 12  |  |
|                              |                                      |  |   |  | 2,000 - 2,999   | 10                               | 14,910                                    | 5   |  |
|                              |                                      |  |   |  | 3,000 - 4,999   | 6                                | 6,502                                     | 6   |  |
|                              |                                      |  |   |  | 5,000 plus  | 17                               | 35,370                                    | 6   |  |
| <u>C. DRY CHEMICALS</u>      |                                      |  |   |  | <u>C. DRY CHEMICALS</u>                               |                                  |   |   |  |
|                              |                                      | (Pounds)                                   |   |  |   |                                  |   |   |  |
| OCDM REGION NO. 1            | 0                                    | -  | -   | -  |   |                                  |   |   |  |
| 2                            | 2                                    | 72,600                                     | 16  | 1 & 4  |   |                                  |   |   |  |
| 3                            | 1                                    | 200  | 4   | 3  |   |                                  |   |   |  |
| 4                            | 13                                   | 325,400                                    | 8   | 4 & 2  |   |                                  |   |   |  |
| 5                            | 21                                   | 226,856                                    | 6   | 5  |   |                                  |   |   |  |
| 6                            | 13                                   | 72,410                                     | 5   | 6  |   |                                  |   |   |  |
| 7                            | 6                                    | 12,050                                     | 6   | 7  |   |                                  |   |   |  |
| 8                            | 3                                    | 93,400                                     | 8   | 8  |   |                                  |   |   |  |
| <u>TOTAL UNITED STATES</u>   | <u>59</u>                            | <u>802,916</u>                             | <u>6</u>                                  |  | <u>TOTAL UNITED STATES</u>                            | <u>140</u>                       | <u>64,825</u>                             | <u>6</u>                                  | <u>5</u>   |
|                              |                                      |  |   |  | TOTALS BY NGL PLANT SIZE:<br>(Bbls/D Liquid Recovery) |                                  |   |   |  |
|                              |                                      |  |   |  | Less than 499   | 26                               | 4,585                                     | 7   |  |
|                              |                                      |  |   |  | 500 - 999   | 26                               | 14,187                                    | 5   |  |
|                              |                                      |  |   |  | 1,000 - 1,999   | 38                               | 14,906                                    | 6   |  |
|                              |                                      |  |   |  | 2,000 - 2,999   | 20                               | 10,837                                    | 6   |  |
|                              |                                      |  |   |  | 3,000 - 4,999   | 16                               | 11,280                                    | 4   |  |
|                              |                                      |  |   |  | 5,000 plus  | 14                               | 9,030                                     | 11  |  |





## APPENDIX TABLE B

SUPPLEMENT TO TABLE 4  
OTHER ITEMS OF MAINTENANCE SUPPLIES KEPT IN LESS THAN THREE MONTHS  
INVENTORY AT REFINERIES AND NATURAL GASOLINE PLANTS

| <u>ITEM</u> | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u> | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|-------------|---|---|-------------|---|---|
|-------------|---|---|-------------|---|---|

AIR & GAS COMPRESSORS (RECIPROCATING)

|              |    |    |                  |   |   |
|--------------|----|----|------------------|---|---|
| BELTS        | 0  | 1  | GOVERNORS        | 0 | 3 |
| BLOWER       | 0  | 1  | HEADS            | 0 | 2 |
| COILS        | 0  | 2  | INSTRUMENT       |   |   |
| COMPRESSORS  |    |    | AIR & GAS        |   |   |
| (AIR OR GAS) | 11 | 3  | UNLOADING        | 1 | 0 |
| COMPRESSOR   |    |    | LUBRICATORS      | 0 | 2 |
| PARTS        | 10 | 15 | MAGNETOS         | 0 | 3 |
| CRANKSHAFT   | 1  | 0  | MOTORS, ELECTRIC | 0 | 1 |
| FILTERS      | 1  | 0  | PUMPS, OIL       | 0 | 1 |
| FOLLOWERS    | 2  | 0  | SEALS            | 0 | 1 |
| GASKETS      | 8  | 13 | SPARK PLUGS      | 0 | 5 |
| GEARS        | 1  | 0  | SPRINGS          | 0 | 1 |

COMPRESSORS (CENTRIFUGAL)

|                  |    |   |               |    |   |
|------------------|----|---|---------------|----|---|
| ALKY REFRIGER-   |    |   | LABYRINTH     | 2  | 0 |
| ATION            | 1  | 0 | PACKING BOXES | 1  | 0 |
| BEARINGS PACK-   |    |   | PINS          | 0  | 1 |
| ING              | 11 | 4 | PUMPS, OIL    | 1  | 0 |
| BLADES           | 2  | 1 | RINGS, "O"    | 7  | 1 |
| CASE             | 4  | 0 | RODS          | 1  | 0 |
| COMPRESSOR, AIR  | 1  | 0 | ROTATING      |    |   |
| COMPRESSOR       |    |   | ELEMENTS      | 12 | 2 |
| PARTS            | 1  | 3 | SEALS         | 0  | 2 |
| COUPLINGS        | 2  | 0 | SEAT          | 1  | 0 |
| DIAPHRAMS        | 1  | 0 | SLEEVE        | 1  | 0 |
| DIFFUSERS        | 1  | 0 | STATOR        | 1  | 0 |
| GASKETS          | 3  | 0 | VALVES        | 0  | 1 |
| GEARS, REDUCTION | 1  | 1 | WORM          | 1  | 0 |
| GUIDES           | 1  | 0 |               |    |   |
| IMPELLERS        |    |   |               |    |   |
| PACKING          | 5  | 3 |               |    |   |

APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>       | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|----------------------------|---|---|-------------------|---|---|
| <u>MOBILE EQUIPMENT</u>    |   |   |                   |   |   |
| COILS                      | 0   | 1   | LOAD LUGGER       |   |   |
| CRANE REPL.                |   |   | PARTS             | 1   | 0   |
| PARTS                      | 9   | 0   | MOTORS            | 0   | 1   |
| FAN DRIVER                 | 0   | 1   | PAYLOADER, LIFTS, |   |   |
| GAS COOLER                 | 0   | 1   | PARTS             | 2   | 0   |
| GREASE & OIL               | 1   | 0   | PLUGS             | 4   | 2   |
|                            |   |   | TUBES             | 0   | 2   |
| <u>BLOWERS, FANS, ETC.</u> |   |   |                   |   |   |
| AIR PACKS                  | 1   | 0   | FILTERS           | 1   | 0   |
| BEARING &                  |   |   | GEARS             | 3   | 3   |
| GASKETS                    | 1   | 0   | GEAR BOXES        | 2   | 1   |
| BELTS                      | 0   | 2   | HUBS              | 0   | 1   |
| COOLING TOWERS             | 6   | 9   | MOTORS            | 2   | 1   |
| COUPLINGS                  | 4   | 3   | SEALS             | 1   | 0   |
| FCC AIR BLOWER             | 9   | 4   | SHAFTS            | 2   | 1   |
| <u>ELECTRICAL SYSTEM</u>   |   |   |                   |   |   |
| BRAKE LINING               | 1   | 0   | GASKETS           | 3   | 0   |
| BRUSHES                    | 0   | 1   | GENERATORS        | 0   | 1   |
| BUSHINGS                   | 1   | 0   | HEATERS           | 2   | 0   |
| CABLE FEEDER               | 2   | 0   | LIGHTING          |   |   |
| CONDULETS                  | 2   | 2   | ARRESTORS         | 1   | 0   |
| CONNECTOR                  | 1   | 0   | LUGS              | 1   | 0   |
| ELECTRICAL                 |   |   | MAGNETOS          | 1   | 0   |
| CABINETS                   | 1   | 0   | METERS            | 7   | 17  |
| ELECTRIC TAPE              | 3   | 0   | OCTANE ENGINE     | 1   | 0   |
| ELECTRONIC                 |   |   | PLUGS             | 1   | 0   |
| TUBES                      | 1   | 0   | RECTIFIERS        | 10  | 5   |
| FITTING                    |   |   | RESETS            | 1   | 0   |
| ARRESTORS                  | 1   | 0   | ROTOR             | 1   | 0   |
| FITTINGS                   | 1   | 0   | SEALS             | 1   | 0   |
| FIXTURES,                  |   |   | STATORS           | 1   | 0   |
| REFLECTORS                 | 4   | 0   | SWITCHBOARDS      | 9   | 15  |
| FUSE LINKS                 | 7   | 4   |                   |   |   |



APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                            | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>     | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|--|---|---|-----------------|---|---|
| <u>ENGINES - GAS, GASOLINE, DIESEL</u> |   |   |                 |   |   |
| BATTERIES                              | 1   | 0   | INJECTORS       | 10  | 16  |
| BLOCKS                                 | 0   | 2   | MAGNETOS        | 2   | 1   |
| BUSHING                                | 0   | 2   | NEEDLE, SLEEVE, |   |   |
| COILS                                  | 0   | 4   | BALL            | 1   | 0   |
| COMPRESSORS                            | 2   | 0   | PACKING         | 0   | 4   |
| CONDENSERS                             | 1   | 0   | PINS            | 0   | 1   |
| CRANKSHAFTS                            | 1   | 0   | ROCKER ARMS     | 0   | 1   |
| FUEL PUMPS                             | 1   | 0   | SEATS           | 0   | 1   |
| GASKETS                                | 0   | 2   | SPARK PLUGS     | 0   | 14  |
| HEADS                                  | 1   | 4   | SPRINGS         | 0   | 1   |
| <u>GENERATORS</u>                      |   |   |                 |   |   |
| ARMATURES                              | 0   | 2   | HEADS           | 0   | 1   |
| BELTS                                  | 0   | 2   | IMPELLERS       | 2   | 0   |
| BRUSHES                                | 7   | 19  | LINES           | 0   | 1   |
| COILS                                  | 1   | 0   | PARTS, MISC.    | 4   | 9   |
| COMMUTATOR                             | 0   | 1   | PLUGS           | 0   | 1   |
| CRANKSHAFT &                           |   |   | ROTOR ASSEMBLY  | 2   | 1   |
| BLOCK                                  | 0   | 1   | SHAFTS          | 2   | 0   |
| EXCITERS                               | 1   | 1   | SLIP RINGS      | 0   | 1   |
| GENERATORS                             | 4   | 4   | VALVES          | 0   | 1   |
| <u>PUMPS - RECIPROCATING</u>           |   |   |                 |   |   |
| BEARINGS                               | 1   | 2   | PROPORTIONERS   | 1   | 0   |
| BELTS                                  | 0   | 1   | PUMPS           | 0   | 3   |
| CASTINGS                               | 2   | 1   | PUMP PARTS      | 1   | 0   |
| COLLARS                                | 1   | 0   | ROCKER ARMS     | 6   | 0   |
| CROSSHEADS                             | 2   | 0   | SEALS           | 1   | 4   |
| CUPS                                   | 1   | 1   | SLEEVES         | 0   | 1   |
| GUIDES                                 | 1   | 0   | STEAM DRIVEN    | 0   | 1   |
| HEADS                                  | 1   | 0   | STEMS & SPRINGS | 3   | 0   |
| LINKAGE                                | 1   | 0   |                 |   |   |

APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                    | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>   | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|--------------------------------|---|---|---------------|---|---|
| <u>PUMPS - CENTRIFUGAL</u>     |   |   |               |   |   |
| CAMS                           | 1   | 0   | LINERS        | 0   | 1   |
| CASES & HEADS                  | 7   | 4   | PISTONS       | 2   | 1   |
| CROSSHEAD                      |   |   | PUMPS         | 0   | 3   |
| PINS                           | 1   | 0   | SLIDE PINS    | 1   | 0   |
| GASKETS                        | 8   | 0   | VALVES        | 0   | 1   |
| GOVERNORS                      | 1   | 0   |               |   |   |
| <u>ELECTRIC MOTORS</u>         |   |   |               |   |   |
| ALKYLATION                     |   |   | MOTORS        | 13  | 18  |
| REFRIGERATION                  | 1   | 0   | REWINDING     | 5   | 2   |
| BRUSHES                        | 1   | 1   | ROTOR STATOR  | 9   | 4   |
| COILS                          | 1   | 0   | SEALS         | 1   | 1   |
| COMPRESSOR                     | 1   | 0   | SHAFT         | 2   | 0   |
| COUPLINGS                      | 1   | 0   | SLEEVES       | 1   | 0   |
| FANS                           | 1   | 0   | STARTERS &    |   |   |
| GASKETS                        | 4   | 0   | SWITCHES      | 1   | 0   |
| HOUSING                        | 1   | 0   | TUBES         | 1   | 0   |
| MAGNET WIRE                    | 1   | 0   | WINDING       | 1   | 0   |
| MOTOR ARMA-<br>TURES           | 3   | 8   |               |   |   |
| <u>REFRIGERATING EQUIPMENT</u> |   |   |               |   |   |
| BELTS                          | 1   | 2   | PACKING       | 0   | 2   |
| COMPRESSOR                     |   |   | PARTS, MISC.  | 6   | 5   |
| PARTS                          | 2   | 3   | PISTONS       | 4   | 1   |
| CONTROLS                       | 1   | 0   | PRESSURE REG- |   |   |
| CRANKSHAFTS                    | 1   | 0   | ULATOR        | 0   | 2   |
| CYLINDERS                      | 3   | 1   | RINGS         | 2   | 2   |
| GOVERNORS                      | 0   | 2   | RODS          | 2   | 1   |
| IMPELLERS                      | 2   | 1   | SHOES         | 1   | 0   |
| LINERS                         | 0   | 1   | VALVES        | 1   | 0   |
| MOTOR REWIND                   | 1   | 0   |               |   |   |



APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                             | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>   | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|---|---|---|---------------|---|---|
| <u>HEAT EXCHANGERS &amp; CONDENSERS</u> |   |   |               |   |   |
| BRASS TUBES                             | 7   | 9   | HEADS         | 1   | 8   |
| CAP HEADS                               | 5   | 0   | METAL         | 0   | 2   |
| CHANNEL                                 |   |   | MONEL TUBES   | 13  | 7   |
| HEADS                                   | 5   | 0   | RETUBING      | 0   | 2   |
| CHROME TUBES                            | 3   | 0   | SCRAPER &     |   |   |
| CONDENSERS                              | 0   | 3   | BLADES        | 1   | 0   |
| CONNECTORS                              | 1   | 0   | SHAFTS,       |   |   |
| CONTROL                                 | 0   | 1   | DRIVE         | 1   | 0   |
| COPPER TUBES                            | 2   | 0   | SHELLS        | 5   | 0   |
| CORES                                   | 0   | 2   | STEEL, STAIN- |   |   |
| CUPRONICKEL                             |   |   | LESS          | 0   | 3   |
| TUBES                                   | 12  | 3   | TUBE SHEETS   | 4   | 14  |
| EXCHANGERS                              | 6   | 4   |               |   |   |
| FILLINGS, END                           | 1   | 0   |               |   |   |
| <u>OPERATING CONTROL EQUIPMENT</u>      |   |   |               |   |   |
| CHARTS                                  | 6   | 7   | MOTOR VALVES  | 0   | 2   |
| CONDENSERS                              | 3   | 0   | ORFICE PLATES | 0   | 4   |
| CONTROLLERS                             | 0   | 6   | PYROMETERS    | 0   | 1   |
| CONTROL                                 |   |   | PNEUMATIC     |   |   |
| MOTORS                                  | 3   | 9   | INSTRUMENT    | 0   | 2   |
| CONTROL                                 |   |   | REGULATORS    | 2   | 12  |
| VALVES                                  | 2   | 7   | SPRINGS PINS  | 0   | 1   |
| COPPER                                  | 1   | 0   | TACHOMETER    | 0   | 1   |
| GASKETS                                 | 0   | 1   | TEMPERATURE   |   |   |
| GOVERNORS                               | 1   | 20  | CONTROLLER    | 0   | 3   |
| ILLUMINATORS                            | 1   | 0   | THERMOMETERS  | 1   | 3   |
| INSULATORS                              | 7   | 1   | TRANSISTORS   | 3   | 0   |
| MERCURY                                 | 0   | 6   | TRANSMITTERS  | 1   | 3   |
| METERS                                  | 0   | 3   | WIRE          | 13  | 16  |
| MOTORS                                  | 1   | 0   |               |   |   |

APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                     | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>     | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|---------------------------------|---|---|-----------------|---|---|
| <u>TURBINES</u>                 |   |   |                 |   |   |
| BUCKETS                         | 1   | 2   | NOZZLE RINGS    | 0   | 1   |
| CASES                           | 0   | 1   | PACKING         | 7   | 4   |
| CASINGS                         | 4   | 4   | PARTS, MISC.    |   |   |
| CASTING PARTS                   | 0   | 3   | REPLACEMENT     | 13  | 6   |
| COILS                           | 1   | 0   | RINGS           | 2   | 4   |
| DIAPHRAMS                       | 1   | 0   | ROTORS          | 1   | 0   |
| GASKETS                         | 2   | 2   | SEALS           | 0   | 1   |
| GEARS                           | 1   | 0   | SHAFTS          | 7   | 6   |
| GOVERNORS                       | 1   | 6   | SHROUDS         | 0   | 4   |
| GOVERNOR                        |   |   | SLEEVES         | 1   | 0   |
| PARTS                           | 6   | 2   | SPRINGS         | 2   | 0   |
| HOUSINGS                        | 1   | 0   | TOWER BOTTOM    |   |   |
| IMPELLERS                       | 1   | 3   | PUMPS           | 1   | 0   |
| INTERNALS,<br>HARDENED          | 0   | 1   | WHEELS          | 2   | 4   |
| <u>PIPE &amp; PIPE FITTINGS</u> |   |   |                 |   |   |
| ALLOY CHECKS                    | 1   | 0   | GATE VALVES     | 7   | 3   |
| ALLOY                           |   |   | GLOBE VALVES    | 4   | 0   |
| MATERIAL                        | 1   | 0   | HIGH PRESSURE   | 1   | 0   |
| ALLOY PIPE                      | 2   | 0   | METAL LIFT PIPE | 1   | 0   |
| ALLOY STEEL                     | 1   | 0   | NIPPLES         | 2   | 3   |
| BOILER, ETC.                    |   |   | PIPE (4" AND    |   |   |
| - TUBES                         | 2   | 0   | OVER)           | 12  | 7   |
| BOILER BLOW                     |   |   | PIPE            | 1   | 0   |
| VALVE PARTS                     | 0   | 1   | PLUG COCKS      | 1   | 0   |
| BRASS VALVES                    | 1   | 0   | REDUCERS        | 2   | 0   |
| CLAMPS                          | 1   | 0   | SCREWED VALVES  | 3   | 0   |
| COPPER TUBING                   | 2   | 0   | SLIP BLIND      | 1   | 0   |
| COUPLINGS                       | 2   | 0   | STUDS           | 3   | 0   |
| CHROME METAL                    | 2   | 0   | TRAPS           | 1   | 0   |
| DUCTILE                         |   |   | TUBES           | 1   | 0   |
| FITTINGS                        | 1   | 0   | TUBING FITTINGS | 3   | 0   |
| ELBOWS                          | 1   | 0   | UNIONS          | 1   | 4   |
| FISHER VALVE                    |   |   | VALVES, SPEC.   | 1   | 0   |
| PARTS                           | 1   | 0   | WELDING         |   |   |
| FITTINGS                        | 5   | 15  | FITTINGS        | 3   | 0   |



APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                            | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>                 | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|--|---|---|-----------------------------|---|---|
| <u>WELDING &amp; CUTTING EQUIPMENT</u> |   |   |                             |   |   |
| ACCESSORIES                            | 1   | 0   | GAS WELDING                 |   |   |
| ARGON &<br>HELIUM                      | 1   | 0   | EQUIPMENT                   | 0   | 2   |
| BEARINGS                               | 1   | 0   | HOSES                       | 1   | 1   |
| CARBIDE                                | 3   | 0   | POWER TOOL                  |   |   |
| CARTRIDGES                             | 1   | 0   | PARTS, SMALL                | 1   | 0   |
| CLUTCHES                               | 0   | 1   | SPECIAL EQUIP-<br>MENT      | 1   | 0   |
| CUTTING REGU-<br>LATOR PARTS           | 1   | 0   | SPECIAL GASES               | 1   | 0   |
| ELECTRIC WELD-<br>ING EQUIPMENT        | 0   | 3   | SOLDER FLUX                 | 0   | 1   |
|  |   |   | WELDING PARTS<br>& SUPPLIES | 3   | 1   |
| <u>COMMUNICATION SYSTEMS</u>           |   |   |                             |   |   |
| AUTOMATIC<br>EXCHANGE<br>EQUIPMENT     | 1   | 0   | RADAR                       | 0   | 1   |
|  |   |   | RELAYS                      | 5   | 6   |
|  |   |   | TELETYPE                    | 1   | 0   |
| <u>HAND &amp; SMALL PORTABLE TOOLS</u> |   |   |                             |   |   |
| AIR DRILL                              | 0   | 1   | PIPE THREADING              |   |   |
| BUFFER                                 | 0   | 1   | MACHINES                    | 7   | 14  |
| DRILL PRESS                            | 0   | 1   | PORTABLE PUMPS              | 7   | 13  |
| GRINDER, BENCH                         | 0   | 1   | POWER TOOLS, AIR            | 1   | 0   |
| HOES                                   | 0   | 1   | POWER TOOLS,<br>ELECTRIC    | 2   | 0   |
| LATHE CUTTING<br>TOOLS                 | 1   | 0   | SOCKET SETS                 | 0   | 1   |
| MACHINES                               | 1   | 0   | TOOLS, TUBE<br>CLEANING     | 0   | 1   |
| PIPE                                   | 0   | 1   |                             |   |   |

APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                            | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>    | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|--|---|---|----------------|---|---|
| <u>SPEED INCREASERS &amp; REDUCERS</u> |   |   |                |   |   |
| BOLTS                                  | 0   | 1   | REDUCERS       | 11  | 11  |
| BUSHINGS                               | 1   | 0   | RIGHT ANGLE    |   |   |
| CARBURETORS                            | 1   | 0   | DRIVES         | 0   | 1   |
| CHAIN                                  | 13  | 13  | SHAFTS         | 5   | 1   |
| CLUTCHES                               | 7   | 14  | SHEAVES        | 0   | 3   |
| COUPLINGS                              | 3   | 6   | SLEEVES        | 0   | 2   |
| DRIVE PARTS                            | 0   | 1   | SPLINES        | 1   | 0   |
| GEAR BOXES                             | 1   | 0   | TORQUE CON-    |   |   |
| INCREASERS                             | 1   | 4   | VERTERS        | 5   | 3   |
| OIL SEALS                              | 1   | 1   | VARIDSCS       | 1   | 0   |
| "O" RINGS                              | 1   | 0   | V PULLEYS      | 0   | 1   |
| <u>MISCELLANEOUS MATERIALS</u>         |   |   |                |   |   |
| AIR                                    | 0   | 1   | GOGGLES        | 1   | 0   |
| ALCOHOL                                | 0   | 1   | GRAPHITE       | 8   | 11  |
| BEARINGS                               | 0   | 1   | GROUND RODS &  |   |   |
| BRICKS                                 | 2   | 0   | CLAMPS         | 6   | 10  |
| BROOM & BRUSHES                        | 1   | 0   | GYPSON         | 0   | 2   |
| BUBBLE CAPS                            | 0   | 1   | HARD HATS      | 1   | 0   |
| CABLE                                  | 1   | 0   | HELIUM         | 1   | 0   |
| CARGO HOSE                             | 1   | 0   | HOSE, FIRE &   |   |   |
| CEMENT                                 | 3   | 0   | STEAM          | 2   | 0   |
| CHARTS                                 | 0   | 2   | HYDRAULIC TEST |   |   |
| CLEANING                               |   |   | EQUIPMENT      | 0   | 1   |
| SUPPLIES                               | 0   | 2   | HYDROGEN       | 1   | 0   |
| COAL                                   | 1   | 0   | INK, SPECIAL   |   |   |
| CONVEYOR BELTS                         | 1   | 0   | RECORDING      | 0   | 1   |
| COPPER TUBING                          | 1   | 1   | KEROSENE       | 0   | 2   |
| DISTILLATE                             | 0   | 1   | LABORATORY     |   |   |
| ENGINE JACKET                          | 0   | 1   | SUPPLIES       | 2   | 0   |
| FUSES                                  | 1   | 1   | LAMPS          | 2   | 0   |
| FILTER PAPER                           | 1   | 0   | LUMBER         | 4   | 2   |
| FLASKS                                 | 3   | 0   | MECHANICAL     |   |   |
| GASKETS                                | 0   | 4   | SEALS          | 1   | 0   |
| GLASS                                  | 0   | 2   | NITROGEN GAS   | 1   | 0   |



APPENDIX TABLE B (Cont'd)

| <u>ITEM</u>                             | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u>    | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|---|---|---|----------------|---|---|
| <u>MISCELLANEOUS MATERIALS (Cont'd)</u> |   |   |                |   |   |
| PACKING                                 | 0   | 1   | SAMPLING BOMBS | 0   | 1   |
| PAINT                                   | 1   | 0   | SAW BLADES     | 1   | 0   |
| PAPER FORMS                             | 1   | 0   | STEEL          | 1   | 0   |
| PINS,                                   |   |   | STELLITE       | 1   | 0   |
| INDUSTRIAL                              | 1   | 0   | THERMOMETER    | 0   | 1   |
| PIPE DOPE                               | 1   | 0   | THIMBLES,      |   |   |
| PLASTICS                                | 1   | 6   | TURNBUCKLES    | 1   | 0   |
| POWER POLES                             | 1   | 0   | TRANSITE       | 6   | 9   |
| PUMP PACKING                            | 2   | 0   | TUBING         | 0   | 1   |
| PUTTY                                   | 0   | 1   | VITREOUS WARE  | 6   | 6   |
| PYDRAWL                                 | 0   | 1   | WATER PAIL     | 0   | 1   |
| RADIO TUBES                             | 1   | 0   | WAX BLANKETS   | 1   | 0   |
| REBAR                                   | 2   | 0   | WIRE           | 1   | 1   |
| RESPIRATORS                             | 1   | 0   | WIRE TUBING    | 1   | 0   |

MISCELLANEOUS MATERIALS FOR REPLACEMENT PARTS

|                |    |    |               |    |    |
|----------------|----|----|---------------|----|----|
| AIR DRIER      |    |    | COPPER        | 10 | 2  |
| REPL. PARTS    | 1  | 0  | COPPER TUBING | 0  | 2  |
| ALLOY PIPE     |    |    | FERROUS       |    |    |
| FITTINGS       | 1  | 0  | ALLOYS        | 0  | 2  |
| ALLOY STEEL    |    |    | FILTERS       | 2  | 0  |
| SHAPES         | 1  | 0  | FIRE BRICKS   | 0  | 1  |
| ALUMINUM       | 13 | 23 | FIRE CLAY     | 0  | 1  |
| ASBESTOS       | 10 | 21 | FORMICA       | 2  | 2  |
| BABBIT         | 13 | 12 | GALVANIZED    | 2  | 0  |
| BEARING METAL  | 2  | 0  | GASKETS       | 0  | 1  |
| BRONZE         | 7  | 0  | LUBRICATOR    | 1  | 0  |
| BRONZE BUSHING | 1  | 0  | MASONITE      | 4  | 11 |
| CARBON         | 1  | 0  | METAL         | 7  | 0  |
| CASTING        | 2  | 0  | MICA          | 1  | 1  |
| CAST IRON      |    |    | MICA GASKETS  | 1  | 0  |
| BUSHING        | 2  | 0  | MONEL         | 8  | 0  |
| CEMENT         | 2  | 1  | MONEL METAL   | 4  | 2  |
| CHROMIUM       | 1  | 4  | NAILS         | 1  | 2  |
| CONNECTORS     | 1  | 0  | NICKEL        | 4  | 1  |

## APPENDIX TABLE B (Cont'd)

| <u>ITEM</u> | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> | <u>ITEM</u> | <u>NUMBER OF<br/>REFINERIES<br/>REPORTING</u> | <u>NUMBER OF<br/>NGL PLANTS<br/>REPORTING</u> |
|-------------|---|---|-------------|---|---|
|-------------|---|---|-------------|---|---|

MISCELLANEOUS MATERIALS FOR REPLACEMENT PARTS (Cont'd)

|               |    |   |              |   |   |
|---------------|----|---|--------------|---|---|
| NON-FERROUS   |    |   | STELLITE     | 7 | 2 |
| METAL         | 0  | 2 | STEEL PLATES | 2 | 2 |
| "O" RINGS     | 0  | 1 | STEEL RODS   | 1 | 0 |
| PACKING       | 1  | 1 | THREADING    |   |   |
| PAINT         | 1  | 0 | MACHINE      | 0 | 1 |
| PISTONS       | 1  | 0 | TIN          | 4 | 3 |
| PLASTICS      | 4  | 5 | TOWER TRAP   | 1 | 0 |
| RERUN         |    |   | TUBING       | 1 | 0 |
| BEARINGS      | 0  | 1 | VALVE STEMS  | 0 | 1 |
| STEEL (STRUC- |    |   | VALVE STOPS  | 0 | 1 |
| TURAL SHAPES) | 10 | 1 | ZINC         | 2 | 2 |



# APPENDIX TABLE C

LIST OF OTHER ESSENTIAL PROCESS CHEMICALS REQUIRED BY U. S.  
REFINERIES TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS  
(ALL CHEMICALS REPORTED BUT NOT SHOWN IN DETAIL ON TABLE 7 to 19).

## CATALYSTS (Supplements Table 7)

|                         |                                       |                      |
|-------------------------|---------------------------------------|----------------------|
| Acid Treated Silica Gel | Ethylene Dichloride                   | Phosphorus Pentoxide |
| Alumina Balls           | Fuller's Earth                        | Sulfur Dioxide       |
| Alumina Oxide           | H <sub>2</sub> S Conversion Catalysts | Sulfur Trioxide      |
| Ammonia Synthesis       | Iron Ore and Wood Chips               | Sulfur Reaction      |
| Bender Sweetening       | Iron Oxide for Ammonia                | Sweetening           |
| Carbon Monoxide Shift   | Synthesis                             | Tabular Alumina      |
| Conversion              | Molybdenum                            | Vanadium Pentoxide   |
| CO Oxidation Catalyst   | Oxo Reactor Catalyst                  |                      |
| Dehydrogenation         |                                       |                      |

## CHEMICALS FOR MANUFACTURE OF LUBRICATING OILS PETROLATUMS AND WAXES (Supplements Table 8)

|                   |                     |                      |
|-------------------|---------------------|----------------------|
| Acetic Acid       | Depressant          | Hydrogen             |
| Acidless Tallow   | Detergent           | Hydroxy Stearic Acid |
| Aluminum Sulfate  | Dewaxing Aids       | Isopropanolamine     |
| Anhydrous Ammonia | Dibenzyl Disulfide  | Isopropyl Acetate    |
| Anti Oxidant      | Dichlor Ethyl Ether | Isopropyl Alcohol    |
| Barium Oxide      | Disodium Phosphate  | Lard Oil             |
| Bauxite           | Dispersant          | Lime Flower          |
| Benzene           | Emulsifier          | Lime Hi-Calcium      |
| Benzol            | Emulsion Breaker    | Litharge             |
| Calcium Chloride  | Ethylene            | Lithium Hydroxide    |
| Caprylic Acid     | Ethylene Dichloride | Lithium Hydroxide    |
| Catalyst Hardener | Fatty Acid          | Monohydrate          |
| Caustic Potash    | Filter Aids         | Liquid Nitrogen      |
| Chlorine Liquid   | Fullers Earth       | Molten Sulfur        |
| Clay              | Fungicide           | Metal Soaps          |
| Cocconut Oil      | Gear Oil Additive   | Methanol             |
| Copper Chloride   | Germicides          | Methanol Alcohol     |
| Coupling Agent    | Glycerine           | Monostearate         |
| Cresol            | Hexane              | Naphthalene          |
| Cresylic Acid     | Hydrofol Glycerides | Naptha Solvent       |
| Cyclohexanol      |                     | Nitro Benzene        |

## APPENDIX TABLE C (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - REFINERIES (Cont'd)

CHEMICALS FOR MANUFACTURE OF LUBRICATING OILS  
PETROLATUMS AND WAXES (Supplements Table 8) (Cont'd)

|                   |                  |                      |
|-------------------|------------------|----------------------|
| Nitrogen          | Rust Inhibitor   | Tallow               |
| Odorant           | Salt             | Toluene-Di-Isocynate |
| Oiliness Additive | Soda Ash         | Titanium Dioxide     |
| Oleic Acid        | Sodium Hydroxide | Toluol               |
| Organic Phosphate | (Caustics)       | Tricresyl Phosphate  |
| Paraffin Wax      | Sodium Sulfite   | Triethanolamine      |
| Phosphoric Acid   | Sodium Sulfonate | Vegetable Wax        |
| Pressure Agents   | Solution Naphtha | Wetting Agents       |
| Propane           | Sperm Oil        | Wool Fat             |
| Propyl Alcohol    | Sulfurized Fat   |                      |
| Resin             | Tackines Agent   |                      |

CHEMICALS FOR TREATING (GASES AND LIQUIDS)  
(Supplements Table 10)

|                           |                     |                        |
|---------------------------|---------------------|------------------------|
| Acetic Anhydride          | Desalting Chemicals | Nitrogen               |
| Activated Clay            | Desiccants          | Oxygen                 |
| Ammonia                   | Dipropylene Glycol  | Pea Gravel             |
| Ammonium Chloride         | Disodium Phosphate  | Phenol                 |
| Anhydrous Ammonia         | Dyes                | Phosphoric Acid        |
| Anti-foam                 | Ethylene Dichloride | Potassium Hydroxide    |
| Attapulugus Clay          | Filter Aids         | Potassium Permanganate |
| Barium Oxide              | Foundry Coke        | Pulverized Slacked     |
| Barium Pentahydrate       | Fullers Earth       | Lime                   |
| Bauxite                   | Furfural            | Rock Salt              |
| Butyl Mercaptan           | Hydrochloric Acid   | Salt, Granulated       |
| Calcium Chloride          | Hydrofluoric Acid   | Silica Gravel          |
| Chlorinated Lime          | Hydrogen            | Sodium Chloride        |
| Chlorine                  | Hypochlorite        | Sodium Hypochlorite    |
| Clay                      | Isopropanol         | Sodium Methyrate       |
| CO <sub>2</sub> (Dry Ice) | Lime                | Sodium Nitrate         |
| CO <sub>2</sub> (Liquid)  | LPG Odorant         | Sodium Sulfide         |
| Copper Carbonate          | Maleic Anhydride    | Sodium Sulfate         |
| Copper Complex            | Mercaptan Removal,  | Sulfonated Cobalt      |
| Copper Deactivator        | Platinum            | Sulfur Dioxide         |
| Copper Naphthenate        | Mercaptans          | Sulfuric Acid          |
| Copper Oxide              | Merox Catalyst      | Tannic Acid            |
| Copper Sulfate            | Metal Deactivator   | Titanium Tetrachloride |
| Cupric Chloride           | Methanol            | Trisodium Phosphates   |
| Demulsifiers              |                     | Zinc Oxide             |
|                           |                     | Zinc Sulfide           |



# APPENDIX TABLE C (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - REFINERIES (Cont'd)

### WATER TREATING COMPOUNDS AND CHEMICALS (Supplements Table 11)

|                          |                            |                    |
|--------------------------|----------------------------|--------------------|
| Algecides                | Copper Sulfate             | pH Control         |
| Alum                     | Corrosion Filming Amine    | Chemical           |
| Amine Base Bacteacide    | Demulsifiers               | Phosphoric Acid    |
| Ammonia                  | Diatomaceous Earth         | Quachrom Glucosate |
| Anthrafil                | Diethylene Glycol          | Silica of Soda     |
| Anti-foam Agents         | Emulsifiers                | Slimicide          |
| Anti-rust Compound       | Flake Caustic              | Sodium Algenate    |
| Boiler Treating Compound | Fuller's Earth             | Sodium Aluminate   |
| Boiler Water Foam        | Glucosates                 | Sodium Bicarbonate |
| Stabilizer               | Gypsum                     | Sodium Dichromate  |
| Bromine                  | Hydrazine                  | Sodium Hydroxide   |
| Calcium Hypochlorite     | Hypochlorite               | Sodium Nitrate     |
| Calgon                   | Inhibitor                  | Sodium Silica      |
| Caustic Potash           | Litharge                   | Sodium Sulfate     |
| Caustic Soda             | Magnesite                  | Sulfides           |
| Chlorophenate            | Magnesium                  | Sulfur             |
| Clay Coagulant           | Mercapto Benzothiazole     | Tannic Acid        |
| Coal                     | Mimosa Crystals            | Zeolite            |
| Cooling Water Treating   | Monoethanolamine           | Zinc Base Material |
| Chemicals                | Neutralizing Amines        | Zinc Sulfate       |
| Copper Chloride          | Organic Sludge Conditioner |                    |

### ADDITIVES AND INHIBITORS AS APPLY TO PRODUCTS (Supplements Table 12)

|                         |                       |                                     |
|-------------------------|-----------------------|-------------------------------------|
| Alpha Methylnaphthelene | Anti-Stripping Agent  | Tertiary Butyl                      |
| -primary reference      | Asphalt Additive      | Catechol -stabilizer for butadienne |
| Diesel Fuel standard    | Glycidyl Phenyl Ester | -styrene                            |
| Amine Complex           | Methanol              | Wax Additive                        |
| Anti-Foam Agents        |                       |                                     |

## APPENDIX TABLE C (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - REFINERIES (Cont'd)

QUALITY CONTROL LABORATORY CHEMICALS (Supplements Table 13)

|                        |                       |                         |
|------------------------|-----------------------|-------------------------|
| Acetic Acid            | Dry Chemical Reagents | Petroleum Solvents      |
| Acetone                | Dry Ice               | Phenolphthalein         |
| Amines                 | Ether, Petroleum      | pH Indicator            |
| Ammonia Hydroxide      | Ethyl Alcohol         | Phosphorus Pentoxide    |
| Ammonium Chloride      | Ethyl Ether           | Potassium Cyanide       |
| Ammonium Sulfate       | Glycerine             | Potassium Iodate and    |
| Analytical Chemicals   | Halogen Reagent       | Iodide                  |
| Aniline Reagent        | Hardness Solution     | Potassium Permanganate  |
| Aromatic Concentrate   | Hydrochloric Acid     | Potassium Sulfate       |
| Aviation Mix 1-T (TEL) | Hydrogen              | Prototype Fuel 100      |
| Barium Chloride        | Hydrogen Peroxide     | & 115                   |
| Benzol Tech.           | Isopropyl Alcohol     | Pyridine                |
| Bromine                | Kauri Solution        | Reagent K Fisher        |
| Buffer Solution 7 pH   | Lead Acetate          | Silver Nitrate          |
| Carbon Dioxide         | Magnesium Chloride    | Sodium Bicarbonate      |
| Carbon Disulfide       | Mercury               | Sodium Chloride         |
| Carbon Tetrachloride   | Methyl Alcohol        | Sodium Hydroxide        |
| Cetane                 | Methyl Ethyl Ketone   | Solvents                |
| Chloroform             | Methyl Orange         | Standard Viscosity Oils |
| Co-Absorbent           | Methyl Red            | Sulfuric Acid           |
| Denatured Alcohol      | Molybdate Reagent     | Toluol                  |
| Diatomaceous Earth     | Monosodium Phosphate  | UVA Solvent             |
| Diesel Fuel            | Nitric Acid           | Water Treating          |
| Disodium Ethylene      | Oxygen                | Compound                |
| Tetraacetate           | Petroleum Ether       |                         |
| Disodium Phosphate     |                       |                         |

CORROSION INHIBITORS (Supplements Table 14)

|                  |                  |                 |
|------------------|------------------|-----------------|
| Amine Complex    | Filming Amine    | Sodium Chromate |
| Antifoam Agent   | Lime             | Phosphate       |
| Chruan-Glucosate | Permacol Boilers | Triethalamine   |
| Copper Complex   | Reformate        | Unicor          |
| Crude Oil        | Soda Ash         | Waxes           |
| Diethylamine     |                  |                 |
| Ferrous Sulfate  |                  |                 |



## APPENDIX TABLE C (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - REFINERIES (Cont'd)

DESSICANTS AND FILTER MEDIA (Supplements Table 15)

|                         |                     |                    |
|-------------------------|---------------------|--------------------|
| Activated Alumina Balls | Diatomaceous Silica | Florite Dessicants |
| Anhydrous Ammonia       | Filter Aid          | Molecular Sieve    |
| Anthracite              | Filter Oil          | Pellets            |
| Charcoal                | Fire Brick Grog     | Silica Gel         |
|                         |                     | Sodium Chlorides   |

OUTSIDE FEED AND BLENDING STOCKS (Supplements Table 16)

|                                    |                           |                      |
|------------------------------------|---------------------------|----------------------|
| Aromatic Solvent and<br>Distillate | Cyclohexane               | Oxoation Feed        |
| Avgas Blend                        | Extract Residual Furfural | Pearl Oil            |
| Aviation Oils                      | Filler                    | 150-Pentane          |
| Benzene                            | Fuel Oil #2               | Petroleum Raw Stock  |
| Black Grease                       | Gas Blending Stock        | Phosphate Compound   |
| Black Oils                         | Gas Oil                   | Propane              |
| Bright Stock                       | Gasoline Additive         | Propylene            |
| Catalytic Feed Stock               | Lube Oil                  | Raffinate            |
| Cat Cracker Feed                   | Lube Oil                  | Reformate            |
| Charge Stock                       | Metal Soap                | Solvent Oil          |
| Coal Spray                         | Mineral Seal Oil          | Synthetic Lubricants |
| Coker Feed                         | MVI Base                  | Wax                  |
| Cumene                             | Naptha, Cut               | Xylene               |
|                                    | Outside Waxes             |                      |

CONTAINERS (Supplements Table 17)

|                  |                  |                |
|------------------|------------------|----------------|
| Barrels (Fiber)  | Cartages         | Pails          |
| Barrels (Wooden) | Containers (Wax) | Pallet (Wood)  |
| Bottles          | Corks            | Petroleum Box  |
| Burlap Bags      | Drums            | Petroleum Tins |
| Cans             | Grease Kit       |                |

MISCELLANEOUS COMPOUNDS AND CHEMICALS (Supplements Table 18)

|             |                   |                     |
|-------------|-------------------|---------------------|
| Acetic Acid | Algaecides        | Aluminum Sulfate    |
| Acetone     | Alumina Balls     | Ammonia             |
| Acetylene   | Alumina, Hydrated | Ammonium Thiocynate |
| Adhesives   | Alum Stearate     | Aniline             |

## APPENDIX TABLE C (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - REFINERIES (Cont'd)

MISCELLANEOUS COMPOUNDS AND CHEMICALS (Supplements Table 18) (Cont'd)

|                           |                       |                        |
|---------------------------|-----------------------|------------------------|
| Animal Oils               | Deicer                | Hydrogen Peroxide      |
| Anti-Foam Agents          | Demulsifiers          | Iodine                 |
| Anti-Stripping Compound   | Denatured Alcohol     | Isobutyric Acid        |
| Argon                     | Desalting Compound    | Isopropyl Alcohol      |
| Arsenic Trichloride       | Detergents            | Keotane                |
| Artic Red Oil             | Diethylhexyl Sebacate | Lanolin                |
| Asbestos Floats           | Disodium Phosphate    | Lard Oil               |
| Attapulugus Clay          | Dowtherm              | Latex                  |
| Barium Oxide              | Dry Ice               | Lead Oleate            |
| Beeswax                   | Dyes                  | Lead Powder            |
| Benzaldehyde              | Emulsion Breaker      | Lime                   |
| Benzol                    | Ethyl Alcohol         | Linseed Oil            |
| Boric Acid                | Ethylene              | Lithium Hydroxide      |
| Bromine                   | Ethylene Dichloride   | Lithium Stearate       |
| Calcium Carbide           | Ethyl Mercaptan       | Lube Oils              |
| Calcium Chloride          | Fatty Acids           | Magnesium Oxide        |
| Carbon Dioxide            | Ferric Alum           | Marble Chips           |
| Carbonyl Methyl Alcohol   | Ferrous Sulfate       | Mercaptans             |
| Castable Refractory       | Filter Aid            | Mercury                |
| Castor Oil                | Flocculating Agent    | Metal Fillers          |
| Catalyst Treating         | Fluoborate            | Methanol               |
| Chemical                  | Fluorite              | Methyl Alcohol         |
| Caustic Potash            | Formaldehyde          | Methyl Alkalies        |
| Caustic Soda              | Freon                 | Methyl Chloroethene    |
| Ceramic Balls             | Gasoline Dyes         | Methyl Indicator       |
| Charcoal                  | Germicidals           | Methyl Phosphate       |
| Chlorethene               | Gilsonite             | Miscellaneous Fats     |
| Chlorinated Wax           | Glue                  | Molybdate              |
| Chlorine                  | Glycerine             | Monosodium Phosphate   |
| Chromates                 | Graphite              | Odor Agents            |
| Citrate                   | Headlight Oil         | Oil Orange Concentrate |
| Citric Acid               | Hexane                | Oleic Acid             |
| Clay                      | Hydrated Lime         | Phenol                 |
| Color Additive            | Hydrochloric Acid     | Phosphorus Penta-      |
| Cresylic Acid             | Hydrofluoric Acid     | sulfide                |
| Crude Rock Sulfate        | Hydrofol Glycerides   | Phosphorus Pentox-     |
| Cutting Oil Base Additive | Hydrogen              | ide                    |



## APPENDIX TABLE C (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - REFINERIES (Cont'd)

MISCELLANEOUS COMPOUNDS AND CHEMICALS (Supplements Table 18) (Cont'd)

|                           |                    |                    |
|---------------------------|--------------------|--------------------|
| Phosphorus Tablets (BC)   | Silica Gel         | Sulfur             |
| Pine Oil                  | Silicones          | Sulfur Dioxide     |
| Pine Tar                  | Silver Nitrate     | Sulfuric Acid      |
| Polyethylene              | Slate Flour        | Talc               |
| Potash Soaps and Flakes   | Soap               | Tall Oil           |
| Potassium Carbonate       | Soda Ash           | Tallow             |
| Potassium Chromate        | Sodium Aluminate   | Toluol             |
| Potassium Dichromate      | Sodium Bicarbonate | Treating Compounds |
| Potassium Hydroxide       | Sodium Chloride    | Trichlorethylene   |
| Potassium Nitrate         | Sodium Chromate    | Tricresylphosphate |
| Potassium Permanganate    | Sodium Fluoride    | Turpentine         |
| Preformed Soap and Flakes | Sodium Nitrate     | Urea               |
| Propyl Alcohol            | Sodium Silicate    | Vegetable Oils     |
| Propylene Diamine         | Sodium Sulfide     | and Acids          |
| Rapeseed Oil              | Soya Bean Flour    | Wood Pulp          |
| Rock Salt                 | Sperm Whale Oil    | X-Fuel             |
| Rosin                     | Stabilizers        | Xylene             |
| Salicyladehyde            | Stearic Acid       | Zinc Dust          |
| Salt (Copper)             | Styrene            | Zinc Oxide         |
| Sebacic Acid              | Sulfonated Oil     | Zinc Sulfate       |

# APPENDIX TABLE D

LIST OF OTHER ESSENTIAL PROCESS CHEMICALS REQUIRED BY U.S.  
NATURAL GASOLINE PLANTS TO MAINTAIN PRODUCTION OF PETROLEUM PRODUCTS  
(CHEMICALS REPORTED BUT NOT SHOWN IN DETAIL ON TABLES 7 to 19).

## CHEMICALS FOR TREATING (GASES & LIQUIDS) (Supplements Table 10)

|                     |                        |                     |
|---------------------|------------------------|---------------------|
| Algae Control       | Ferric Chloride        | Potassium Carbonate |
| Ammonia             | Hypochlorite           | Salt Brine          |
| Anti-Foam-Agents    | Iron Oxide Chips       | Soda Ash            |
| Caustic Potash      | Iron Oxide Wood Sponge | Sodium Carbonate    |
| Demulsifier         | Phosphoric Acid        | Sulfuric Acid       |
| Diethylene Chloride |                        |                     |

## WATER TREATING COMPOUNDS & CHEMICALS (Supplements Table 11)

|                                       |                                   |                          |
|---------------------------------------|-----------------------------------|--------------------------|
| Activated Carbon                      | Diatomaceous Earth                | Sodium                   |
| Alum                                  | Formaldehyde                      | Sodium Bicarbonate       |
| Amine Type Inhibitor                  | Fungicide                         | Sodium Carbonate         |
| Antifoam Agents                       | Gypsum                            | Sodium Chrome            |
| Bentonite Clay                        | Hydrazine                         | Glucosate                |
| Bentonite-Montmorillonite Clay        | Hyperchloride                     | Sodium Lignin            |
| Boiler Feed Water Earth               | Hypochlorite                      | Sulfonate                |
| Filter Compounds                      | Laundry Bleach                    | Sodium Metasilicate      |
| Boiler Water Compounds                | Lignin Derivatives                | Sodium Nitrate           |
| Borax                                 | Magnesium Hydroxide               | Sodium Pentachlorophenol |
| Bromine                               | Magnesium Oxide                   | Sodium Sulfide           |
| Calcium Hypochlorite                  | Metal Deactivator                 | Solids Suspension        |
| Calgon                                | Muriatic Acid                     | Compounds                |
| Carboxy Methylcellulose               | Octadecylamine                    | Sulfur                   |
| Chlorofonates                         | Penta Chloro Phenates             | Sulfur Dioxide           |
| Chrome Glucosate                      | Potash                            | Sulphates                |
| Citric Acid                           | Potassium Permanganate            | Tannin                   |
| Coagulants                            | Pyro Glucosate                    | Tetrachrome              |
| Conditioner (Cooling Tower)           | Quachrome Glucosate               | Tetra Glucosate          |
| Conditioner (Sludge)                  | Quachrome Tetraphospho Glucosate  | Tetraphospho Glucosate   |
| Cooling Water Treatment               | Quebracho                         | Volatile Amine           |
| Corrosion Inhibitors                  | Scale Inhibitor                   | Water Treating           |
| Diamene Copper Naphthenate in Alcohol | Slimicides                        | Compounds                |
|                                       | Soda-Acid Hypophosphate Treatment | Zeolites                 |



## APPENDIX TABLE D (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - NATURAL GASOLINE PLANTS (Cont'd)

ADDITIVES AND INHIBITORS AS THEY APPLY TO PRODUCTS (Supplements Table 12)

|                      |                     |           |
|----------------------|---------------------|-----------|
| Aluminum Sulfate     | Ethylene Dichloride | Oronite   |
| Antioxidants         | Metal Deactivator   | Additives |
| Chromates            | Napoleum            | Phosphate |
| Corrosion Inhibitors | Neutralizer         | Tannin    |
|                      | Octydecilammine     |           |

QUALITY CONTROL LABORATORY CHEMICALS (Supplements Table 13)

|                             |                         |                      |
|-----------------------------|-------------------------|----------------------|
| Acetone                     | Chloride Standard       | Hydrozine Reagent    |
| Acetone, Reagent Grade      | Solution                | Indicators           |
| Acids & Bases Reagent Grade | Chromate Indicator      | Iodide Crystals      |
| Activated Charcoal          | Chromate Standard       | Iodine               |
| Ammonium                    | Solution                | Lead Acetate         |
| Ammonium Chloride           | Cobalt Bromide          | Lead Oxide           |
| Hydroxide                   | Cobalt Bromide Plugs    | Mercury              |
| Ammonium Molybdate          | Cresol Green            | Methyl Green         |
| Anhydrous Magnesium         | Cresol Red              | Indicator            |
| Perchlorate                 | Cuprous Chloride        | Methyl Orange        |
| Aniline                     | Desiccants              | Indicator            |
| Bacteria Testing            | Dibutyl Maleate         | Methyl Purple        |
| Compounds                   | Diethyl Formamide       | Indicator            |
| Barium                      | Doctor Solution         | Methyl Red           |
| Benzene                     | Ethane Standard         | Indicator            |
| Boiler & Cooling Tower      | Reference Sample        | Molybdate Reagent    |
| Water Test Chemicals        | Ethyl Ether             | NGAA Standard Refer- |
| Bromocresol Green           | Flowers of Sulfur       | ence Sample          |
| Indicator                   | Gallic Acid             | Nitric Acid          |
| Buffer Solutions            | Glycerine               | Nitrogen Liquid      |
| Butane Standard Reference   | Hardness Buffer         | Oil Testing Chem-    |
| Sample                      | Hardness Indicator      | icals                |
| Calcium Chloride            | Hardness Titration      | Orthotoluidine       |
| Calcium Chloride            | Helium                  | Oxygen               |
| Anhydrous                   | Hydrochloric Acid       | Pentane              |
| Carbon Dioxide              | Hydrochloric Acid Conc. | Petroleum Ether      |
| Charcoal                    | Hydrogen Ion Indicators | Phenolphthalein      |
| Charcoal (Activated)        | Hydrogen Peroxide       | Indicator            |
|                             | Hydroquinone            | Potassium            |

# APPENDIX TABLE D (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - NATURAL GASOLINE PLANTS (Cont'd)

### QUALITY CONTROL LABORATORY CHEMICALS (Supplements Table 13) (Cont'd)

|                            |                              |                         |
|----------------------------|------------------------------|-------------------------|
| Potassium Chromate         | Sodium                       | Starch Indicator        |
| Potassium Chrome Indicator | Sodium Hydroxide             | Sulfamic Acid           |
| Potassium Hydroxide        | Sodium Plumbite              | Sulfite Reagent         |
| Potassium Iodate           | Sodium Thiosulfate           | Sulfur                  |
| Potassium Iodide           | Sodium Sulfite               | Sulfuric Acid           |
| Propane Standard           | Standard Titrating Solutions | Sulfuric Acid (Conc.)   |
| Reference Sample           | Standard Versenate           | Trichloroethene         |
| Reference Fuels            | Solution                     | Water Testing Chemicals |
| Silver Nitrate             | Stannous Reagent             | Xylol                   |

### CORROSION INHIBITORS (Supplements Table 14)

|                            |                         |                                 |
|----------------------------|-------------------------|---------------------------------|
| Absorption Oil             | Imidazalene             | Sodium Chromate                 |
| Algicides                  | Kontal                  | Glucosete                       |
| Ammonia (Refrigerant)      | Metallic Phosphates     | Sodium Sulfite                  |
| Armeen                     | Neutralizing Amines     | Steam Line Corrosion Inhibitors |
| Calcium Chloride           | Permacal Octadecylamine | Sulfuric Acid                   |
| Carbon Dioxide Neutralizer | Potassium Bichromate    |                                 |
| Chromates                  | Silica Gel              |                                 |
| Filming Amines             | Sodium Carbonate        |                                 |
| Gas                        | Sodium Chromate         |                                 |

### DESICCANTS AND FILTER MEDIA (Supplements Table 15)

|                    |                  |                      |
|--------------------|------------------|----------------------|
| Activated Charcoal | Calcium Chloride | Mercury (for meters) |
| Aluminum Sulfate   | Filter Elements  | Molecular Sieves     |
| Anthrafilt         | Fluorite         | Silica Gel           |
| Brilliant Asbestos | Hydrogen Gas     | Soda Ash             |

### OUTSIDE FEED AND BLENDING STOCKS (Supplements Table 16)

Hexane



## APPENDIX TABLE D (Cont'd)

## LIST OF ESSENTIAL PROCESS CHEMICALS - NATURAL GASOLINE PLANTS (Cont'd)

CONTAINERS (Supplements Table 17)

|                       |                        |              |
|-----------------------|------------------------|--------------|
| 1 & 5 Gal. Metal Cans | Sample Bottles (Glass) | Wooden Boxes |
| Metal Sample Cans     |                        |              |

MISCELLANEOUS COMPOUNDS AND CHEMICALS (Supplements Table 18)

|                       |                     |                     |
|-----------------------|---------------------|---------------------|
| Acetone               | Diesel Fuel         | Oxygen              |
| Acetylene             | Diethylene Glycol   | Potassium Chromate  |
| Algicide              | Disodium Phosphate  | Potassium Hydroxide |
| Aluminum Pellets      | Ethyl Alcohol       | Potassium Iodide    |
| Aluminum Sulfate      | Ethylene            | Propane             |
| Ammonia (Refrigerant) | Fire Resistant      | Propylene Glycol    |
| Ammonia Solution      | Lubricant           | Silica Gel          |
| Anhydrous Ammonia     | Freon               | Silicate of Soda    |
| Antifreeze "Glycol"   | Fungicide           | Silicone Lubricant  |
| Butane (Refrigerant)  | Gaseous Carbon      | Silver Nitrate      |
| Calcium Chloride      | Dioxide             | Slimecide           |
| Carbon Tetrachloride  | Gasoline Dye        | (Algeacide)         |
| Castor Oil            | Glycerine           | Sodium Bichromate   |
| Catalyzed Sodium      | Glycol              | Sodium Chromate     |
| Sulphite              | Heat Medium Oil     | Sodium Chrome       |
| Ceramic Balls         | Helium              | Glucosate           |
| Chemicals for Boiler  | Hydraulic Fluid     | Sodium Hydroxide    |
| Water                 | Hydrochloric Acid   | Sodium Nitrate      |
| Chemicals for Cooling | Hydrogen Peroxide   | Sodium Sulfate      |
| Tower                 | Inhibited Acid      | Sodium Thiosul-     |
| Chromate              | Iso-Propyl Alcohol  | phate               |
| Chromate & Phosphate  | Laboratory Reagents | Stannous Chloride   |
| (Compound)            | Lead Acetate        | Stove Oil           |
| Cleaning Solvents     | Lube Oil            | Sulfite             |
| Coagulant Aid         | Mercury             | Sulfuric Acid       |
| Copper Sulfate        | Nitrogen            | Toluene             |
| Cyclohexylamine       | Non-Chromate        | Trichlorethylene    |
| Demulsifying Compound | Inhibitor           | Vegetable Oil       |
| Desalting Compound    | Oil, Absorption,    | Liquid Soap         |
| Dichromate Sodium     | Napoleum            | Volatile Amine      |

APPENDIX TABLE D (Cont'd)

LIST OF ESSENTIAL PROCESS CHEMICALS - NATURAL GASOLINE PLANTS (Cont'd)

FIRE FIGHTING CHEMICALS  
(Supplements Table 19)

Carbon Tetrachloride  
Fire Extinguishers  
Helium

Nitrogen  
Soda  
Soda Acid

Sodium Bicarbonate  
Sulphuric Acid



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NOTE: Mr. Harry E. Jacobs initially served as Government Co-Chairman  
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